TABLE OF CONTENTS

INTRODUCTION 3
A DETAILED INTRODUCTION FOR NOVICES 5
Cable Connections 5
Listening to the Factory sounds 6
Listening to the Multi Programs 6
Your First Sound Program 6
The Amplifier Envelope 7
The First Filter 8
Filter Moulation 9
The Saturation Stage 11
The Second Filter 11
The First Oscillator 14
The Second Oscillator 15
The MIXER Section 17
The LFOs 18
LFO 1 18
LFO 2 20
LFO 3 21
Volume and Panorama Position 21
Velocity 22
Twin Mode 22
The Chorus/Flanger Effect 22
The Delay Effect 23
More to Come 23
COMPREHENSIVE OVERVIEW 24
Operating Modes 24
Operating Conventions 25
Parameter Selection and Data Entry 25
Knob Mode 25
Display of Numeric Parameter Values 26
Operating Modes 28
Multi Single Mode 28
The Store Modes 28
Controller Assignments 28
Edit Mode 29
THE PARAMETERS 30
Sound Parameters with a Dedicated Control Element 30
Master Volume 30
Definable 1/2 30
Transpose 30
LFO 1 30
LFO 2 31
Oscillator 1 32
Oscillator 2 33
Mixer 34
Filters 34
Filter Routing 35
Amplifier 37
Sound Parameters in the Edit Menu (Single) 38
Edit Mode 38
Output 38

Twin Mode ... 39
Chorus ... 40
Delay ... 41
Punch ... 43
Oscillator 1 ... 43
Oscillator 2 ... 44
Oscillators Phase Init ... 44
Sub Oscillator ... 44
Noise ... 45
Filters ... 45
LFO 1 ... 46
LFO 2 ... 47
LFO 3 ... 48
Input ... 49
Sound Parameters in the CTRL Menu (Single) ... 52
Part Enable ... 52
Common ... 52
Arpeggiator ... 54
Velocity ... 55
Assign 1-3 ... 57
Definable 1/2 ... 58
Global Parameters / System Parameters / MIDI Parameters ... 60
MIDI Dump ... 60
MIDI ... 61
MIDI Control ... 62
System ... 62
MULTI Parameters in the EDIT Menu ... 65
Single Select ... 65
Part Transpose ... 65
Part Detune ... 65
Part Volume ... 65
Part MIDI Panorama ... 65
Output Select ... 66
Delay Multi ... 67
MULTI Parameters in the CTRL Menu ... 69
Part Select ... 69
Part Enable ... 69
MIDI Channel ... 69
Low Key ... 69
High Key ... 69
MIDI Volume Enable ... 70
Hold Pedal Enable ... 70
Program Change Enable ... 70
Appendix ... 71
Definable 1/2 Parameter List ... 71
Assign 1-3 Source- and Destination Parameter List ... 73
MIDI Controller Assignments ... 76
Poly Pressure Controller Assignments ... 78
MIDI Implementation Chart ... 80

INTRODUCTION

Dear Virus Owner,

Congratulation on your choice, the new Virus. You have purchased a cutting-edge synthesizer that comes fully loaded with several revolutionary features. Here are just a few of the highlights:

- The Virus delivers the sound characteristics and tone of traditional analog synthesizers - for instance the Prophet 5 or Memorymoog to name just two popular examples of the species - in a previously unparalleled level of quality and handling ease. We're not kidding, the Virus actual delivers the authentic response of an analog synth via a digital signal processor chip, although the sound shaping and voicing options out-perform those of it historical predecessors by a considerable margin.

- The Virus offers a maximum of twelve voices. In Multi Mode, these can be allocated dynamically to sixteen simultaneously available sounds.

- You have no less than two audio oscillators plus one suboscillator, a noise generator, two Multi Mode filters, two envelopes, a stereo VCA, three LFOs and a saturation stage (SATURATOR) for cascade filtering, tube and distortion effects.

- Two of the three oscillators produce 66 waveshapes, three of which are dynamically mixable so that spectral effects are possible within the confines of a single oscillator. In conventional synthesizers, this type of effect requires several oscillators. Synchronization and frequency modulation between the audio oscillators delivers additional complex spectral effects that you can use for all kinds of sound shaping purposes.

- The filters can be switched in series or in parallel within the voices via several options. When you switch the filters in series, the saturation stage is embedded between the filters. Consequently, an overdriven filter resonance can be re-filtered within the same voice! A maximum of six filter poles (36 dB slope!) enables radical tonal manipulations. And if for some reason these options are insufficient for what you have in mind, the Virus features a well-engineered signal routing system that allows you to patch the voices to the filters of other voices in parallel or in series for further sound shaping.

- You can also process two external audio signals - either two independent mono signals or a combination stereo signal - via the filters, VCAs of the voices and the Virus' internal effects in virtually any manner you see fit.

- Four of the sixteen sounds in Multi Mode feature individual (!) chorus/flanging units. You also have a delay at your disposal. It can be routed to all sixteen sounds via the internal FX loop. All effects process stereo signals.

- The LFOs feature five waveshapes each, including a triangle with variable symmetry and infinitely variable aperiodic oscillations for random variation of the controlled parameters. The LFOs are capable of polyphonic as well as monophonic oscillation. In other words, if several voices are active, the LFOs can run independently or in sync. A number of keyboard trigger options enable you start LFO waveshapes with variable phase lengths at the beginning of a note and/or to cycle once only, like an envelope.

- Sounds and effects are patched out via six audio outputs which of course can also be used to route three stereo signals out.

- And last but not least, you have all of these features without the major hassles inherent in vintage analog synthesizers. Compared with its behemoth predecessors, the Virus is exceptionally compact, light-weight and dependable. You never have to contend with lengthy warm-up periods and pitch instability due to temperature changes. (You might even feel that the Virus is TOO small. Those massive analog beasts certainly had a stunning visual effect, especially on stage. However, we will guarantee that you will change your mind the first time you carry your Virus into a rehearsal room and find that you are not even winded. The long-term benefits become apparent when your chiropractor stops sending you Christmas cards.)

In additional to its killer sounds and tone, the Virus was designed to deliver ultimate handling and control comfort. It is equipped with dedicated knobs and buttons for the crucial synthesizer functions, the more unusual parameters are accessible via data entry procedures. We distinguished between these two levels of expertise to enable you to create complex sounds while keeping the user interface as clear and uncluttered as possible. If you enjoy devising complicated sound structures, you can set the Virus to Expert Mode, where you will find a wide range of additional intriguing sound parameters. A novice might find the vast number of options daunting, so we kept them separate from the standard operating mode.
In all modesty, we are especially proud of a feature we developed called Adaptive Parameter Smoothing. For the first time in the history of synthesizers equipped with memories, you can manipulate a knob or control feature without an audible step or increment. In other words, the sound does not change abruptly but SEAMLESSLY. No more zipper noises! The Virus responds just as smoothly as analog synthesizers did prior to the introduction of digital sound storage. Additionally, the four control feature operating modes let you program a sensible as well as practical setup for the diverse live and sequencer-based applications.
And users of contemporary software sequencers will appreciate the fact that the Virus sends all sound shaping commands immediately in the form of MIDI Controller or Poly Pressure data (and of course accepts all of the corresponding Controller and Sys-Ex messages). This feature lets you dynamically control the Virus and all its functions via computer.

Although far from complete, the features listed above give you some indication that you now own an exceptionally versatile, high-quality musical instrument that will give you plenty of joy for years to come. We certainly hope you can fully exploit the enormous potential of this fine instrument.

Have fun and enjoy!

Your Virus Development Team

A DETAILED INTRODUCTION FOR NOVICES

This section provides deliberate, step-by-step guidelines on operating and handling the Virus for those of you who are new to the world of synthesizers and MIDI. The following covers basics such as how to connect the Virus to an AC power supply, your MIDI system and your audio system. Then we will guide you through a series of experiments designed to demonstrate the different functional groups, their control features and the tasks they execute.

After you have finished reading this section, you will be able to handle virtually all of the sound generating and sound shaping functions of the Virus. All of these are described in context, along with their control features. Even the majority of less significant functions, accessible via menus, are discussed here. You will find a detailed, comprehensive description of all functions of your new synthesizer in the section following this introduction.

Please keep in mind that within confines of this introduction, we are unable to impart all of the knowledge and skills in acoustics, sound synthesis and MIDI control you might desire or need to acquire. If you are keen to learn more about these subjects, you should consider becoming a regular reader of one or several of the leading trade publications in your country. Your local musical instruments dealer or more experienced musicians will be able to recommend the best magazines to you. And of course there is a wide range of books available on these subjects.

If you decide to read this section, we recommend you read it in its entirety from the start - rather than begin with a subsection that is of particular interest to you. A fitting metaphor for the basics discussed in this section might be a house where each bit of information in a subsection is a brick that builds on a preceding brick and interlocks with those next to it. You want your knowledge base to be a sound structure so you won t run into problems when you find one of the bricks is missing.

Cable Connections

Before you connect the Virus to an AC outlet and the rest of your equipment, ensure that all of the devices are switched OFF.

Connect the **MIDI OUT** of the desired MIDI send device (keyboard, computer, hardware sequencer, etc.) with the **MIDI IN** of the Virus.

Connect the audio outputs of the Virus with the signal inputs of your audio system. In order to receive a signal, as a minimum you must connect the output **OUT 1 R/MONO**. However, we recommend you also connect the output **OUT 1 L** so you are able to enjoy the stereo sounds of the Virus.

Once you have established the desired cable connections, make sure the main volume controls of all the connected devices (Virus: **MASTER VOLUME**, located at the upper left hand of the control panel) are dialed to the lowest possible setting. Switch the devices on in the following sequence: the MIDI send device (computer, master keyboard, etc.) first, then the sound generators (Virus and the other signal sources), followed by the mixing console and finally the amplifier. Now while you are sending notes on MIDI Channel 1 of the Virus, turn the master volumes of the connected devices up in the same order that you switched the devices on. Be sure to keep on eye on the signal level indicators of your mixing console.

Listening to the Factory Sounds

The program memory of the Virus was loaded with sound programs (SINGLE PROGRAMs) and sound combinations (MULTI PROGRAMs) before it left the factory. To hear the SINGLE PROGRAMs (and gain an initial impression of the possibilities your new instrument has to offer in terms of sounds), first make sure your MIDI source is sending on MIDI Channel 1.

Press the **SINGLE** button. A number, a letter, number and name appear in the display. These indicate the the MIDI Channel, the current Program Bank (A or B) as well as the number and name of the current sound program. Now if you play notes you should be able to hear this sound and a ¼ note (the round dot at the end of the note staff is solid black) should appear in the display every time you press a key and release a key. If you do not hear a sound but you see a half note (blank note head) check to see if you are sending on the wrong MIDI Channel.

Press the **VALUE** button to call up the 128 single programs of Bank A in sequence. (The VALUE pot is inactive in this operating mode.) To hear the remaining 128 single programs stored on Bank B, use the PARAMETER button to activate the other program bank.

Listening to the Multi Programs

The Virus not only has the capability of playing single programs, but also combinations consisting of more than one sound (MULTI PROGRAMs) simultaneously (MIDI Multi Mode). To call up the multiprograms, press the MULTI button and select these combination programs via the VALUE button. The Virus features only 128 multiprograms, so you don t have to switch back and forth between banks they way you just did while activating single programs.

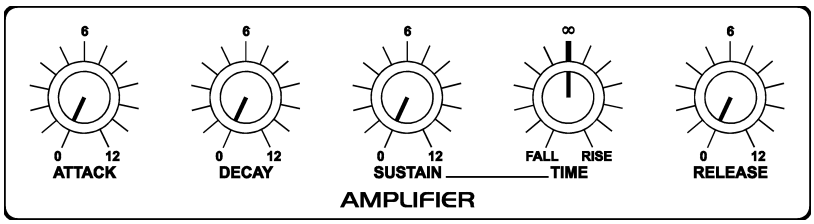
The majority of available MULTI PROGRAMs contain sound combinations that are controlled via a single MIDI channel. In these multiprograms, the sounds involved are allocated side-by-side (split) or on top of one another (layered) on the keyboard. In other MULTI PROGRAMs, the sounds are divided up over several MIDI channels to make it easier to work with a sequencer. If you activate a MULTI PROGRAM and hear a single sound only, then you should control this MULTI PROGRAM via several channels.

Your First Sound Program

If you have never created or changed a sound on a synthesizer, we now have the pleasure of introducing you to this fascinating process.

Select the single program **A127 - START -**. Press any key on the connected keyboard. You should hear a sound that, for lack of better description, is a bit harsh or biting, but above all completely static. It should start immediately after you press a key and sustain indefinitely for as long as you hold the key down. As soon as you release the key, the sound should end abruptly. This sound is not designed to be especially pleasant; it is intended to be as neutral as possible to give you a basis from which you can begin creating or shaping your own sound.

The Amplifier Envelope



Long-term exposure to this sound will definitely grate on your nerves, so let s get started with changing it into a signal you might enjoy hearing, beginning with the volume characteristics. Locate the section labeled **AMPLIFIER** at the bottom right of the control feature panel of the Virus. Here you can see five pots labeled ATTACK, DECAY, SUSTAIN, TIME and RELEASE, respectively. These controls will help you to dial in volume characteristics called an amplifier envelope and put an end to the nerve-racking drone that may remind you of one of those cheesy organs that you hear in 60s B-movie sound tracks.

Rotate the **ATTACK** pot while you repeatedly engage a key to hear the note. The further you turn the pot up, the longer it takes for the sound to achieve maximum volume after the start of the note. So you can say ATTACK controls the initial volume swell of the sound.

Presumably the ATTACK pot was set to a random position before you made any adjustments. Nevertheless the volume automatically increased to the maximum level before you started rotating the pot. The reason for this is that an ATTACK value of 0 is saved in the sound program - START - and this value remains valid until you determine a new value by adjusting the position of the pot, even if you turn it ever so slightly.
Take a look at the display of the Virus to gain an impression of the difference between these two values. It shows two numeric values when you dial a pot: at the left you can see the value stored in the sound program and at the right, the numeric equivalent to the value determined by the current position of the pot.

NOTE: Always keep in mind that for a programmable synthesizer the position of the control feature or pot does not necessarily indicate the actual value of the given function. The reason for this is that when you first activate a sound program, it will reflect the programmed value. You have to adjust the control feature before the programmed value is superseded by the value you determine manually.

Now fiddle with the **DECAY** pot while you repeatedly press a key to activate a note. Hold the key down for good while. You will notice that the volume, once it reaches maximum level at the end of the ATTACK phase, drops until it reaches a minimum level. The DECAY pot determines the speed, or in synthesizer jargon, the rate at which the volume decreases. However, the DECAY level does not always drop to the minimum level; you can determine a random value between the maximum and minimum levels at which the volume remains constant. This level in turn is controlled via the SUSTAIN pot.
Whenever the SUSTAIN level is set to maximum, the volume cannot drop during the DECAY phase; in other words, in this situation the DECAY pot is ineffective.

NOTE: The individual functions of a synthesizer are designed to interact; many functions are dependent on other functions. In a number of cases this means that some functions are subordinate to others, i.e. the effectiveness of a control feature is altered, modified or even negated completely by other related functions.

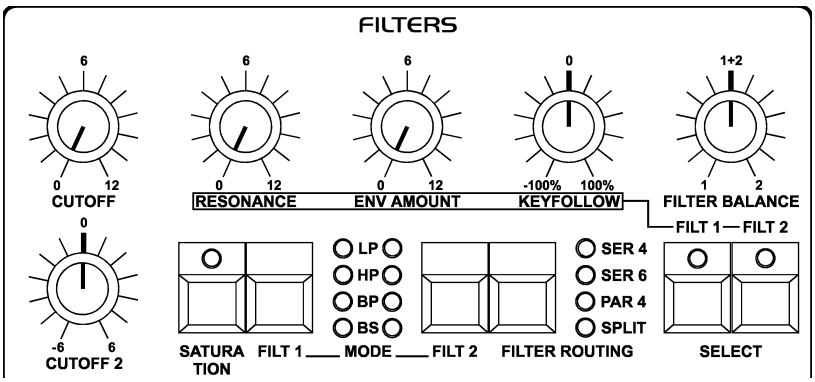
The next phase of the amplifier envelope is determined by the **SUSTAIN-TIME** pot: If the pot is set to the center position (12 o clock) indicated by the mathematical infinity symbol, then the SUSTAIN level remains constant through to the end of the note; if you turn it counter-clockwise to the left (towards

FALL), then the level drops off at an increasing rate towards the minimum level much in the manner you just experienced with the DECAY pot; If you turn the pot clockwise to the right (towards RISE), the level rises at an increasing rate to maximum and remains there until you release the key.

The final pot, **RELEASE**, determines the speed or rate at which the volume decreases when you release the key: At low values the sound ends relatively abruptly, at high values, the sound fades out more gradually and softly. The length of the RELEASE phase also depends on which level the amplifier curve is at when you release the key: The lower the level, the shorter the RELEASE phase. If you dialed in a brief DECAY or SUSTAIN-TIME phase and it ended while you held the key down then of course there will not be an audible RELEASE phase.

The amplifier envelope can be described as a variable curve which, depending on the type and duration of attack, hold and release data, automatically influences an imaginary volume pot (turns it up or down). At the beginning of the note, ATTACK controls the rise or rate of increase to the maximum level. Once the maximum level is achieved, DECAY determines the fall or rate of decrease to the SUSTAIN value, which is infinitely variable between the minimum and maximum levels. The amplifier envelope may remain at this value until the end of the note, fall towards the minimum level as determined by the variable TIME value, or even rise again towards the maximum level. After the end of the note, RELEASE controls the fall or rate of decrease to the minimum level. Consequently, the control pots labeled ATTACK, DECAY, TIME and RELEASE control a speed or rate, where as SUSTAIN actually controls a level.

The First Filter



Now we will take a look at a component of a synthesizer that is generally regarded as the most important functional unit as it enables drastic sound shaping measures: the filter - or in the case of the Virus, the two filters.
But first we will concentrate on just one of the two filters.

Locate the **CUTOFF** pot (not to be confused with CUTOFF 2!) in the section labeled FILTERS, directly above the section labeled AMPLIFIER. Rotate the pot to the left and right and note how the sound becomes muddier and clearer in response to the direction in which you turn the pot. (To ensure this effect and the following aural experiments are most pronounced, adjust the amplifier envelope so that the Virus generates a constant level while you hold a key down).

This is how a low pass filter works: it suppresses, or in technical jargon, attenuates the higher frequencies in a signal and allows the lower frequencies through. Think of the CUTOFF pot as a bouncer and the Virus as your pub. You can tell it which frequencies to let in and which frequencies to keep out. The frequencies above the so-called cutoff or filter frequency are suppressed, those below it remain unaffected.

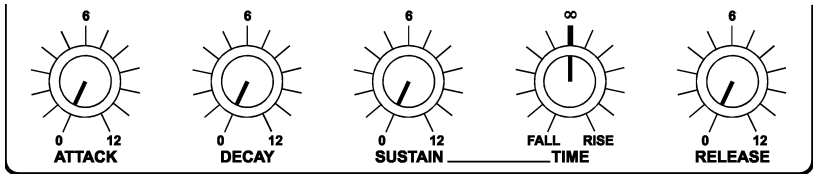
Now locate the **FILT 1 MODE** switch which is also located in the FILTERS section. It enables you to select a filter operating mode from the four available options:

- **LP**: the low pass filter we have just discussed.
- **HP**: the high pass filter which works in the opposite manner of the low pass filter: It suppresses the lower frequencies in a signal and lets the higher frequencies pass.
- **BP**: the band pass filter which suppresses both ends of the tonal spectrum and allows only a narrowly defined bandwidth of the original sound to pass.
- **BS**: The band stop filter, band reject filter or notch filter which works in the opposite manner of the band pass filter. It allows all of the frequencies of a signal except for a narrow frequency band around the cutoff to pass. The term notch is fairly descriptive; you might say this filter chops a notch out of the sound spectrum.

Now activate the different operating modes and rotate the CUTOFF pot to get a feel for the way each filtering option works.

Along with the CUTOFF pot, the **RESONANCE** pot is the most important control feature of a filter. The filter resonance increases the volume of the frequencies located near the cutoff frequencies and suppresses the more remote frequencies. This sound shaping feature has a striking effect - especially when used in conjunction with the low pass filter: it produces a nasal or honking type of tone which increases as you turn the resonance up. Experiment by varying the RESONANCE setting in the different operating modes in conjunction with different CUTOFF settings. You will find the effect that the RESONANCE pot achieves is markedly different for the band stop filter in comparison to the effect it has on the other filter types: as the resonance increases, the bandwidth of the notch decreases; in other words more frequencies on both sides of the filter frequency are allowed to pass.

Filter Modulation



Of course we don t want to require you to execute every sound modification manually by twiddling pots. All kinds of sound modifications in the Virus can be executed automatically much in the way of your previous experiments with the volume controls: The amplifier envelope can be described as a variable curve which, depending on the type and duration of attack, hold and release data, automatically influences (turns it up or down) an imaginary volume pot.

Similar procedures are applicable to the filter frequencies. The FILTERS section features its own envelope, the structure of which is identical to the amplifier envelope, located directly above the amplifier envelope on the control feature panel. Much like the amplifier envelope, the filter envelope automatically rotates the CUTOFF pot.

However there is one significant difference between the two envelopes. With the amplifier envelope, you are always dealing with an initial volume level of 0 because of course you want absolute silence prior to the beginning of a note. After the RELEASE phase, it is again highly desirable that your box is silent. With the filter envelope, the situation is somewhat different: It always starts at the CUTOFF value that you

determined manually. And it is definitely not always desirable that the filter frequency is brought to the maximum level.

Consequently, you need a tool that limits the effective range of the filter. This is why we equipped the Virus with a control labeled **ENV AMOUNT** (short for Envelope Amount). When the pot is turned counter-clockwise to the far left, the filter has no effect on the cutoff frequency; the further you turn the pot to the right, the greater the effect the filter envelope has on the filter frequency. The maximum level of the envelope may lie outside the audible range when the filter has already been partially opened via the CUTOFF pot or was manipulated via other control options. In extreme cases where the filter is already completely open, the filter frequency cannot be increased regardless of how high you set the ENV AMOUNT.

Go ahead and spend some experimenting with different ENV AMOUNT, CUTOFF and RESONANCE settings for the diverse filter operating modes. Also try varying the settings for the amplifier envelope. You will find that with just these few parameters you are able to come up with a vast amount of sound settings. If you are among the many musicians who are associative listeners, you might say many of the settings produce sounds reminiscent of stringed-instruments; some sound picked, plucked or snapped, others sound bowed.

For your next experiment set the amplifier envelope so that you hear a constant level when you press and hold a note. Now deactivate the filter envelope by setting the ENV AMOUNT to 0. Set Filter 1 to low pass mode and decrease the filter frequency until you just barely hear a muddy signal when you play notes in the mid-range.

Now play a few higher and lower notes. You will find that the lower notes have a greater overtone content, whereas the higher notes sound muddier and their volume decreases until the notes are completely inaudible. You might already suspect what this is all about: As the notes are transposed ever lower, more portions of the signal fall below the cutoff frequency, whereas with the notes that are transposed ever higher, more portions of the signal rise above the cutoff frequency and subsequently are suppressed until the root note and the last audible portion of the signal is silenced.

To avoid this effect - or if desirable, to amplify it - you have the option of influencing the cutoff frequency via the pitch of the note, i.e. the note number. The degree of influence is determined by the **KEY FOLLOW** pot.

Please note that KEY FOLLOW is a so-called bipolar parameter: Its control range is not limited to the positive end of the spectrum (0 to a maximum of 127). Bipolar controls effect negative values as well, in this case from the negative maximum of -64 through 0 an on to the positive maximum of 63. Consequently, if this pot is set to the center position (12 o clock or 0) the pitch of the notes corresponding to the keys on your keyboard has no effect on the cutoff frequency. If on the other hand you turn the KEY FOLLOW pot clockwise towards the positive control range, you will find that the filter opens up increasingly as the pitch increases with higher notes. At lower notes, the filter closes down again. If you turn the pot counter-clockwise towards the negative control range, the KEY FOLLOW effect is reversed. With the Virus, you will encounter this feature - intensity control via a bipolar parameter - again in conjunction with other modulation sources and targets.

Now experiment as much as you like with different KEY FOLLOW settings and tune the settings via the CUTOFF pot. And remember to bring all of the other parameters you have encountered thus far into play.

The Saturation Stage

In the signal chain of the Virus, Filter 1 is followed by a saturation stage. It enables you to add overtones to the filtered signal via distortion. Locate and press the button labeled **SATURATION** in the FILTERS section. The display will read SATURATION CURVE OFF , which means exactly what it says. With the VALUE buttons or the VALUE pot, you can now select from a number of saturation/distortion curves. Once you have selected a curve, the SATURATION button LED illuminates.
Regardless of what the display might indicate at any given time, this LED will always illuminate when you have activated a saturation curve.

At this point we would like to mention the **OSC VOL** pot in the MIXER section. The portion of the control range from the far left to the center position (12 o clock) determines the volume of the filter section s input signal. The portion of the control range located to the right of the center position (12 o clock) does not achieve any increase in volume; it simply intensifies the degree of saturation or distortion. This effect is only achieved when you have activated a saturation curve.

Feel free to experiment with the diverse saturation curves and be sure to vary the OSC VOL settings. Note how the different CUTOFF and RESONANCE settings influence the saturation curve.

The Second Filter

You probably noticed that by a adding a bit of saturation to the signal you can come up with a pretty heavy, aggressive sound - especially with a low filter frequency level and high resonance. You re probably thinking these types of sounds could do with some more filtering. We had the same idea, which is one of the reasons why we equipped the Virus with another filter per voice.

The technical design of this second filter is identical to the first, so we won t discuss it in as much detail as we did the first filter. However, there are few differences in how you handle the second filter: Only two control features of the Virus are allocated exclusively to Filter 2: **CUTOFF 2** and FILT 2 MODE. The RESONANCE, ENV AMOUNT and KEY FOLLOW pots can be allocated to either of the two filters or both simultaneously. Use the two SELECT buttons located at the far right of the FILTERS section to select the desired operating mode. For instance, if you press the FILT 2 SELECT button, then the values you set via the RESONANCE, ENV AMOUNT and KEY FOLLOW pots apply exclusively to Filter 2. The corresponding parameters of Filter 1 remain unaffected. On the other hand, if you press both SELECT buttons at the same time, the values that you dial in apply by the same measure to Filters 1 and 2.

In the sound program we are using for our experiments, the LEDs of both buttons are illuminated, so that all adjustments to the given parameters affect both filters. However, you have yet to actually hear the effect of Filter 2 on the signal because it is mixed out of the audible signal path of the Virus.

Before we get started with our next experiment, deactivate SATURATION, set the ENV AMOUNT of the filter envelope to zero and set CUTOFF 2 to the center position (12 o clock) so that Filter 2 always has the same cutoff frequency as Filter 1 (we ll explain CUTOFF 2 a bit later). Set CUTOFF to a medium or middle value and turn the RESONANCE pot counter-clockwise to the far left to achieve a relatively muddy sound. Now locate the FILTER BALANCE pot at the upper right hand of the control panel and rotate it from the left to the right. You will note the sound becomes muddier as you turn the pot towards the center position (12 o clock) and that the sound is somewhat brighter at the far right of the control range then at the far left.

The reason for this effect is that when you turn the **FILTER BALANCE** pot to the far left, only Filter 1 is audible. When you rotate the pot to the right, Filter 2 is blended in so that it follows Filter 1 in the signal

chain. When you turn the FILTER BALANCE pot clockwise, Filter 1 is blended out of the signal chain until at the far right position only Filter 2 is active and audible.

The term used to describe the efficiency of a filter is slope. The unit of measurement is the so-called filter pole: the more poles a filter has, the greater its slope. Each filter in the Virus normally features 2 poles. However in the **FILTER ROUTING** operating mode SER 6, Filter 1 operates with 4 poles, so the signal patched through Filter 1 (FILTER BALANCE to the far left) is trimmed more drastically than when it is routed through Filter 2 (FILTER BALANCE to the far right). When you set the FILTER BALANCE pot to the center position (12 o clock) - as we mentioned before - the two filters are routed in series, which means they respond as if they were a single filter with 6 poles and consequently a great deal of slope. This is why the input signal is trimmed substantially when you set the pot to this position.

Experiment with the diverse FILTER BALANCE positions to get a feel for the different degrees of slope. Rotate the CUTOFF pot or activate the filter envelope (for both filters!) to hear the filters in action.

The CUTOFF 2 pot is a special feature: It controls the cutoff frequency of the second filter, but is subordinate to the CUTOFF pot located above it. In other words, at the center position (12 o clock) the manually selected frequency of Filter 2 is identical to that of Filter 1. When you rotate the pot to the left the cutoff frequency level of Filter 2 is increased relatively to Filter 1, when you turn to pot to the right the cutoff frequency level is decreased relatively. Now when you adjust the CUTOFF pot, you adjust the cutoff frequency of both filters by the same measure! This feature lets you determine a difference in values in the filter frequencies (called an offset) via the CUTOFF2 pot which remains constant whenever you adjust the CUTOFF pot.

Yet another experiment in which you can come up new filtering characteristics that are typical of the Virus:
Set the FILTER BALANCE pot to the center position (12 o clock) and CUTOFF 2 to the maximum level. The FILTER ROUTING operating mode must remain SER 6. Set CUTOFF and RESONANCE to a middle value and select a clearly audible SATURATION curve.
Now you can filter this complex signal produced by a combination of the saturation stage and the Filter 1 yet again. Rotate the CUTOFF 2 pot slowly towards the center position (12 o clock). You can hear how Filter 2 gradually modifies the distorted signal. You can set a RESONANCE value for Filter 2 if you press the **FILT 2 SELECT** button and rotate the RESONANCE pot to the desired position. Set the CUTOFF 2 pot to a position to the right of the center position. This configuration can be described as a complex non-linear filter set up where the cutoff frequency is controlled via the CUTOFF pot. You can dial in a wide range of sound-shaping option via CUTOFF 2. Also try modifying the resonances of both filters as well as the SATURATION curve to come up with different filtering characteristics.

Now experiment with the diverse filter modes and listen closely to the effect of the parameters RESONANCE, ENV AMOUNT and KEY FOLLOW in conjunction with the SELECT button. Please also keep in mind that the chances of choking a sound off are substantially greater when you are using both filters: For instance, if the first filter is used as a low pass with a low cutoff frequency and the second as a high pass with a high cutoff frequency, the Virus will not generate an audible signal when you set the FILTER BALANCE pot to the center position (12 o clock).

The final parameter we ll discuss for the time being is FILTER ROUTING. This feature offers several filter routing options which allow you to operate the filters in series, i.e. patch one after the other in the signal chain, or in parallel, which means side by side in the signal chain:

SER 4 The filters are switched in series; with two poles each, both filters have the same slope for a total of four filter poles.

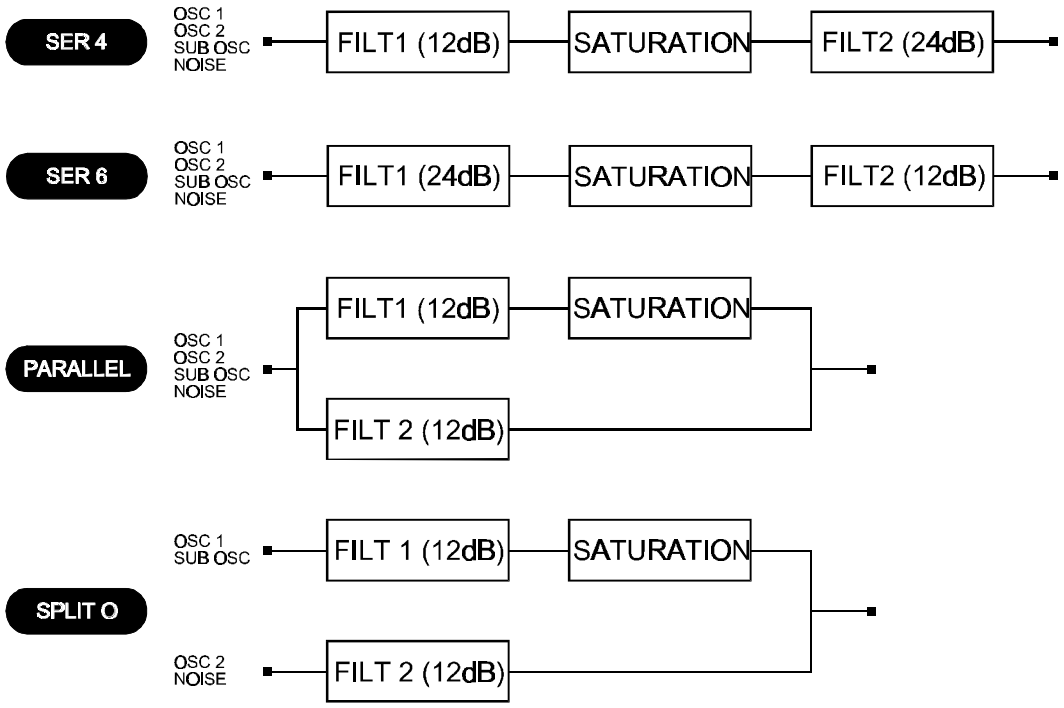
SER 6 The filters are switched in series; Filter 1 has four poles, Filter 2 has two poles so the overall slope is equivalent to six poles.

PAR 4 The filters are switched in parallel and feature two poles each.

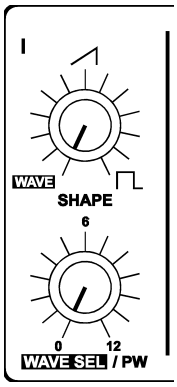
SPLIT The filters are switched in parallel and feature two poles each. Additionally, they receive independent input signal s (more on this later). The stereo position of the signals can also be manipulated via the parameter TWIN MODE PAN SPREAD in the EDIT menu.

Regardless of which FILTER ROUTING option you chose, the SATURATION stage is always post-Filter 1, i.e. after Filter in the signal chain.

FILTER ROUTING



The First Oscillator



To this point, we have turned our attention exclusively to sound-shaping functions and have always started with the same basic material: a so-called sawtooth wave. This waveshape is especially well-suited as a neutral starting point as it contains all of the so-called natural scale of overtones, which give the filter plenty of quality material to work with.

The filters, with the exception of a notch filter or band stop (BS), trim the far reaches of the tonal spectrum, so for instance a signal sounds muddier after it has been routed through a low pass filter. You can well imagine that this type of sound modification is substantial but insufficient for shaping more subtle differences in tone. For instance the tone of a trumpet differs significantly from that of a saxophone even though no one would seriously claim that either of the instruments has a muddier tone than the other.

What you need is a sound-shaping option for the portion of a signal that a filter allows to pass. And of course you also need a tool for determining the pitch of a signal. In synthesizers, both of these tasks are executed by oscillators. They oscillate at a variable pitch that can be modulated and they also generate different waveshapes which give the filters a wider variety of material to work with.

The Virus is equipped with two main oscillators and a so-called suboscillator. We will first take a look at Oscillator 1, which is the oscillator you have already heard in action during your experiments thus far.

Dial in the same basic sound that you started with at the very beginning. Now modify the amplifier envelope so you are working with a less grating sound, but hold back on any other filter or saturation modifications so you can hear the purest oscillator signal possible.

Locate the section labeled 1 , it is bordered off in a separate area at the far left of the section labeled OSCILLATORS. No check out the two pots labeled SHAPE and WAVE SEL/PW. These enable you determine the waveshape and consequently the tonal spectrum of Oscillator 1.

In the sound program, **SHAPE** is preset to the center position (12 o clock), which is equivalent to a value of 64. On the pot, this position is identified via a graphic depiction of a sawtooth wave. You can definitely see why this waveshape bears the name sawtooth. Press and hold a key and slowly turn the pot clockwise. You should be able to hear how the tone becomes increasingly more hollow-sounding. You might say this effect thins the sound out, but in any case, the entire tonal spectrum is affected by an equal measure, which is an audio result filters are unable to achieve.

The waveshape that is audible when you turn the SHAPE pot to the far right is a so-called pulse wave. The graphical representation of this waveshape on the control panel gives you a good idea of its appearance. It is unique because the duration of the negative pulse is equal to the duration of the positive pulse: It has a so-called pulse width of 50 . The tone of a pulse wave is different to that of a sawtooth wave because it does not contain all overtones in the natural overtone scale, only the odd-

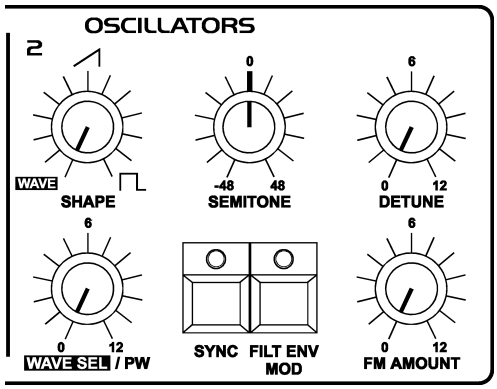
numbered tones, i.e. the first (the root note that determines the pitch), third, fifth, and so forth. By turning the SHAPE pot from the sawtooth control range towards the pulse control range, you are actually dialing every other overtone out of the mix, which explains why the sound becomes thinner.

You can continue modifying the sound by reducing the symmetrical width of the pulse wave. In the Virus, you can execute this sound-shaping measure via the **WAVE SEL/PW** (PW pulse width) pot, PROVIDED THE SHAPE POT IS SET TO A POSITION IN THE RIGHT HALF OF ITS CONTROL RANGE (LATER THAN 12 O CLOCK). Rotate the WAVE SEL/PW pot slowly from the left to the right and leave the SHAPE pot at the far right position. You can hear how the treble content of the sound increases while the sound becomes ever thinner. At the far right position, the signal is no longer audible because the pulse width is equivalent to 0 and consequently the wave no longer oscillates.

Starting at the center position (12 o clock) indicated by the sawtooth, turn the SHAPE pot counter-clockwise towards the left. You can hear how the overtones are increasingly mixed out of the signal until you can only hear the root note. This sound is produced by a so-called sine wave, one of 64 other waveshapes that you have at your disposal for sound generation purposes. These waveshapes can also be activated via WAVE SEL/PW (WAVE SEL: Wave Select), PROVIDED THE SHAPE POT IS SET TO A POSITION IN THE LEFT HALF OF ITS CONTROL RANGE (EARLIER THAN 12 O CLOCK). Regardless of the current SHAPE setting, you can also select a wave in the EDIT menu under OSCILLATOR 1 WAVE.

Go ahead and check out the different waveshapes. The second of the 64 waves is a triangle wave, the remainder of the waveshapes are each a unique tonal blend. After you have familiarized yourself with this raw material, experiment with the parameters of the FILTERS and AMPLIFIER sections you have dealt with thus far (don t forget about SATURATION and the corresponding function of the OSC VOL pot), to get a feel for how the diverse waveshapes respond to filtering, saturation and amplifier modifications.

The Second Oscillator



As we mentioned previously, in addition to the other sound sources, the Virus is equipped with a second oscillator. udging from the amount of control features on this oscillator s section of the control panel, you have probably already gathered that it has more sound-shaping options than Oscillator 1.

Dial in the basic sound program that you had at the very beginning; change the amplifier envelope to suit your taste. In the sound program, the **OSC BAL** (Oscillator Balance) pot in the MIXER section is preset to the far left. In order to hear Oscillator 2 in action, rotate the OSC BAL (Oscillator Balance) pot in the MIXER section to the right. Towards the center position (12 o clock) you will hear how the tone is modified and as you rotate the pot further to the right, how the intensity of this modification is reduced. This effect is known as the comb filtering effect. It occurs when two signals with the same frequency but different phase lengths are mixed. Press the same key on your keyboard several times with the OSC BAL set to the center position (12 o clock). You should notice that each note has a slightly different tone. The

oscillators are the source of this effect. The oscillators of the Virus oscillate freely, consequently every time you play a note, the phase constellation between the two oscillators is different. For now, leave the OSC BAL POT at the center position (12 o clock).

You are already familiar with Oscillator 1 s **SHAPE** and **WAVE SEL/PW** pots. These functions are identical for Oscillator 2, so we won t go into detail on them again.

Locate the pot labeled **DETUNE** and slowly rotate it to the right from the far left position (which is preset in the sound program). You can hear the tone start to waver and as you turn the pot further to the right, how this vibrato effect increases until Oscillator 2 sounds distinctly out of tune with Oscillator 1. This wavering or vibrato-type effect has a popular traditional in synthesizers. It is used to achieve chorus effects, create sounds reminiscent of stringed instruments/ string sections or simply beef up the sound.

The **SEMITONE** pot enables you to transpose Oscillator 2 by plus/minus four octaves in semitone steps while Oscillator 1 maintains the pitch. This feature is especially interesting when used in conjunction with two other oscillator functions: synchronization and frequency modulation.

Locate and activate the **SYNC** button in the OSCILLATOR 2 section (the LED must illuminate). The synchronization function forces Oscillator 2 to restart its wave cycle at the same time as Oscillator 1 waveshape starts its cycle. The initial effect of this measure is that the wavering tone that resulted from detuning and mixing the oscillator signals disappears.

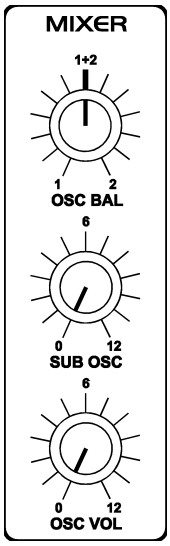
The SYNC effect really becomes interesting when you transpose Oscillator 2 upwards in comparison to Oscillator 1 via the SEMITONE pot. What happens is that the wave cycle of Oscillator 2 is interrupted as soon as Oscillator 1 starts its cycle. The pitch of the second oscillator no longer has the expected effect, instead it generates special tones, in some cases for lack of a better description screaming type effects.

The other effect that benefits from manipulating the interval between the oscillators is frequency modulation (FM). It generates new tonal spectra in which the signal of the first oscillator controls the frequency of the second oscillator similar to the manner in which filters can be controlled via envelopes. And here too you have a pot which allows you to control the intensity of: **FM AMOUNT**. In contrast to an envelope, which consists of a single slow continual process initiated at the start of a note, the controlled oscillator fluctuates periodically and in an audible frequency range. Consequently you are unable to hear the individual pulses of the modulation; instead you hear a radical change in tone.

In the Virus you have the option of combining the two functions called oscillator synchronization (SYNC) and frequency modulation (FM AMOUNT, to generate new harmonic spectra. Switch SYNC on and experiment with the FM AMOUNT. Also try out different SEMITONE settings and the diverse waveshapes of Oscillator.

The function **FILT ENV MOD** lets you use the filter envelope to control the frequency of OSCILLATOR 2 and the FM intensity. Here you can switch back and forth between the parameters **FM AMOUNT** and **OSC 2 PITCH** by repeatedly pressing the FILT ENV MOD button. The currently valid value appears in the display of the Virus.
Each of the two parameters has a bi-directional value range of -64 to 63. Enter the desired values via the VALUE pot or VALUE buttons. As soon as you have determined a value other than 0 for one of the two parameters, the LED of the FILT ENV MOD button will illuminate to indicate a modulation is underway here.

The MIXER Section



You have already come across two parameters of the MIXER section: **OSC BAL** determines the mix ratio between Oscillators 1 and 2; in the left half of its control range, **OSC VOL** determines the master volume of the oscillator mix. In the right half of the control range from the center position to the far right, OSC VOL increases the saturation intensity when a SATURATION curve has been activated.

Now we ll take a closer look at the final control element, the **SUB OSC** pot: It controls the volume of the third oscillator, the so-called SubOscillator, which always operates an octave below Oscillator 1. The SubOscillator is mixed to the Oscillator 1 and 2 master mix signal as determined by the OSC BAL pot. The master volume of the composite mix is controlled by the OSC VOL pot. The only other parameter available for the SubOscillator is accessible via the EDIT menu where you have the option of selecting a triangle or pulse waveshape (**SUB OSCILLATOR WAVE SQUARE/TRIANGLE**).

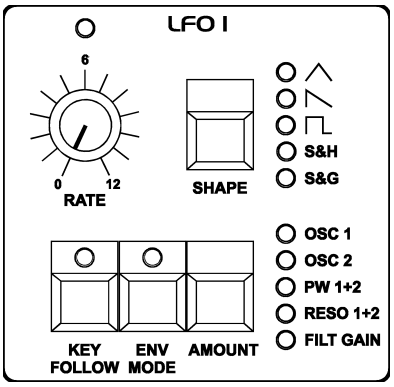
The final voice-internal signal source of the Virus has no visible control features on the control panel: the Noise Generator. It has no dedicated sound parameters, only the option of determining its volume (**NOISE VOLUME** in the EDIT menu). Please keep in mind that the level of the Noise Generator is not subject to the master volume controlled by the OSC VOL pot. In other words, it is audible even when OSC VOL is set to 0.

Now we can go on and solve the mysteries of the signal flow as determined by the FILTER ROUTING operating mode **SPLIT**: Here Oscillator 1 and the SubOscillator are routed to Filter 1, whereas Oscillator 2 and the Noise Generator are routed to Filter 2. Although the sound sources are split into two signal paths, you can still control the volume levels of the different elements as well as OSC VOL in the usual manner.

The LFOs

When you first started this series of experiments with sounds, we promised that many of the functions the Virus can be programmed so that they are executed automatically. You have already learned how to control the volume and cutoff frequencies of both filters as well as the pitch and intensity of the frequency modulation of Oscillator 2 via preprogrammed envelopes. These options are great, but you have already encountered a number of functions where it would be a helpful if you could also program them to be executed automatically. And of course envelopes are great modulation sources, but you have to play a note every time you want to initiate an envelope. During your experiments you probably came across a function or two you would like to be able to control periodically - independently of notes. Some features that come to mind are traditional techniques such as vibrato (periodic pitch control) and tremolo (periodic volume control). Another option you might like to have at your disposal is random parameter control.
In the Virus, both of these tasks are executed by a so-called LFO (low frequency oscillator) that oscillates at frequencies below the audible range. An LFO is similar to the oscillators you have encountered thus far, but it oscillates significantly slower so that its output signal is too low for human hearing. So what good are they if you can t hear them LFOs are used in much the same manner as envelopes, with the major difference that the are repeated indefinitely.

LFO 1



Start with the usual basic sound configuration or chose a modified sound to suit your taste. Locate the **RATE** pot in the LFO 1 section of the control panel. The RATE pot is equipped with an LED that indicates the speed of the LFO as well as its waveshape. Turn the RATE pot and check out how the flash of the LED indicates the change of pace as you rotate the pot.

Currently you are unable to hear the effect of the LFO as its modulation intensity is set to 0 in the sound program. In order to change this setting, you must access the **AMOUNT** button which works in conjunction with five vertically arrayed LEDs labeled OSC 1, OSC 2, PW 1 2, RESO 1 2 and FILT GAIN: Press the AMOUNT button repeatedly and observe how the LEDs flash in succession (the LEDs OSC 1 and OSC 2 flash separately as well as in unison). The corresponding modulation targets appear in the display, along with the modulation intensity values as determined by the VALUE pot and VALUE buttons. (You can also scroll through the modulation targets via the PARAMETER button after you have pressed the AMOUNT button once.) Once you have dialed in a value other than 0 for a modulation target, the corresponding LED illuminates continually. This feature tells you at a glance that a modulation is underway even when the display indicates some other type of operation.

Here are the definitions for the modulation targets:

OSC 1 refers to the frequency of oscillator 1

OSC 2 refers to the frequency of oscillator 2

PW 1+2 means that the pulse widths of both oscillators are controlled in unison

RESO 1+2 refers to the resonances of both filters. Please keep in mind that although each set of these parameters is assigned a common modulation intensity, you can still dial in different sound-shaping settings manually. In other words, the audible result of a joint modulation varies according to the values you have determined for the other parameters.

FILT GAIN This term refers to the input level of the first filter (and of course the subsequent saturation level) - although WITHOUT THE LEVEL COMPENSATION CONTROLLED VIA OSC VOL. Here you can actually modulate a parameter that is not manually accessible. The effect of a FILT GAIN modulation is a periodic change in the saturation level which is linked to a corresponding tremolo (periodic change in volume). If the signal is not saturated in any manner, then the only audible result is a tremolo effect.

Modulate the five parameters separately and in combinations with different intensities. Try to anticipate the sound you will come up when you modulate the first oscillator, the second oscillator or both oscillators at once and see if the results match your expectations. If you can fairly reliably predict the outcome of your sound-shaping effort, this should you have a handle on the information discussed thus far and can use it to create specific sounds you have in mind.

During the course of your experiments, it is entirely possible that you have generated modulations that have no effect whatsoever on the sound, for instance if you modulate the frequency of Oscillator 2 although it is dialed out of the oscillator mix. When you run into this type of problem, check out the signal routing, see if any configurations conflict with each other and memorize the situation, problem and solution. If you make a habit out of this, you won t panic when you run into similar situations; instead you ll keep your cool, analyze the unexpected sound and fix the mix.

You are currently using a triangle as the LFO waveshape. You shouldn t have any problem associating the periodic up and down fluctuation of the target parameter with this waveshape. Now activate the other available waveshapes for LFO 1 and try to picture the respective waveshape and associate it with the results of the modulation.

The second waveshape is a descending sawtooth wave. You can convert it into to an ascending sawtooth by simply dialing in the requisite negative modulation intensities (AMOUNT).

Two waveshapes require an in-depth explanation: S H (Sample and Hold) is a structured random modulation. Here random modulation values are generated. The value is held until the next beat impulse, then it abruptly jumps to a new random value.

S G (Sample and Glide) is a continual random modulation. Here the random values glide seamlessly into one another, the rate of which is determined by random modulation of the RATE value.

Continued your experiments with different LFO waveshapes. Note that after a while you no longer consciously hear minimal modulation intensities - depending on the waveshape and modulation target (e.g. S G 1 on OSC 1 or 2). However they do pep up the sound of lend it a certain vitality. The key to many great sounds are these types of minimal modulations.

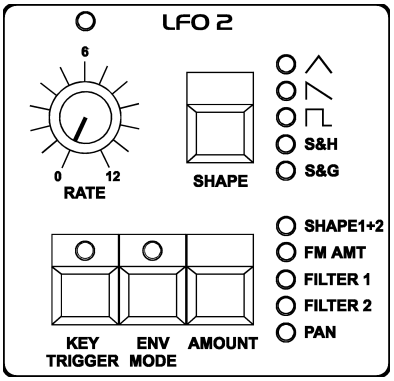
You may have gathered that the LFOs of the Virus are polyphonic: If several notes are played simultaneously, these are controlled by dedicated LFOs, each with a slightly varied rate. This effect livens up the sound of chords, especially when they are sustained. To enhance this effect, activate the **LFO 1 KEY FOLLOW** button.
This function enables you to control the rate of the LFOs via the pitch, or more accurately, via the MIDI note number, so that higher notes generate faster LFO rates. As result, when you press and hold several notes you will hear all kinds of substantially different periodic fluctuations.

Finally, the LFO can also be used as an envelope. The control feature for this effect is the **ENV MODE** button. When you press this button, two things occur: For one, the LFO no longer initiates its cycles periodically, but only once at and in sync with the start of a note, and for the other, the active range of the LFO is switched from bipolar (in both directions from the zero position) to unipolar (from zero in one direction only). Please note that this applies to the modulation target but not the modulation intensity. Here you can still determine a value in the entire bipolar range.

This effect is especially prominent when used in conjunction with the sawtooth wave, which enables a fade-out type of effect (when you dial in a positive AMOUNT value) or a volume-swell type of effect (negative AMOUNT) for the available modulation targets. Dial in the desired speed via the RATE pot.

You can also use S H and S G in ENV MODE to come up with some attractive results: S H generates a single random value at the start of a note (in this case, the RATE pot has no effect); S G works in the same manner although in this case the RATE value is crucial. It determines the amount of time it takes to glide from the previous to the new random value.

LFO 2

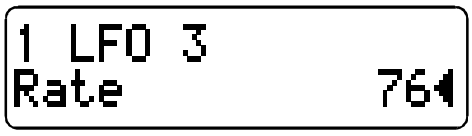


The design of the second LFO is essentially the same as the first, so we ll spare you the repetition of details. The only two differences are immediately apparent when you look at the control panel: SHAPE 1 and 2 are available as a joint modulation target; the FM intensity, filter frequencies and the Panorama position can be manipulated individually. And instead of the KEY FOLLOW function of LFO 1, here you have an option entitled **KEY TRIGGER**. It works like this:

When you press the KEY TRIGGER button, the wave cycle of LFO 2 is started anew with the same phase length at start of each note. This effect is similar to ENV MODE, except that the LFO continues to oscillate when the note is initiated. By the way, ENV MODE is available regardless of whether you chose to activate the KEY TRIGGER or not.

LFO 3

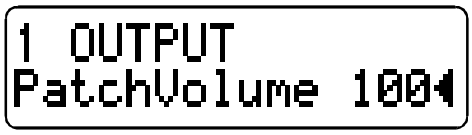
You will find another LFO in the EDIT menu. In comparison to the others, this LFO is a stripped-down version. Basically all it does is control the frequencies of the two oscillators. It is primarily used to generate vibrato independently of the main LFOs. You can control its effect on the oscillators via the modulation wheel. For more information on this LFO, refer to the detailed section of the manual.



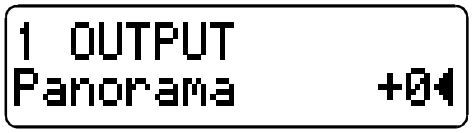
Volume and Panorama Position

You probably noticed that the many of the sound shaping options available in the Virus occasionally influence the volume level. For instance, an unfiltered sawtooth is naturally louder than a highly filtered sawtooth because whenever you blend a part of the frequency spectrum out of the mix, you are automatically reducing the overall volume of the signal. This is why the Virus is equipped with a programmable volume pot for each SINGLE PROGRAM. It enables you to balance out the volume levels of your sound programs.

Locate the parameter **PATCH VOLUME** in the OUTPUT section of the EDIT menu. Its value is set to 100 so that you have a reserve or headroom of 27 volume increments when you are dealing with highly filtered sounds.



You have already dealt with the Panorama position as a modulation target of LFO 2. Here you can not only modulate it, but also determine settings manually. For this purpose, use the parameter **PANORAMA** which is also located in the OUTPUT section of the EDIT menu. Like many other parameters, Panorama is a starting point for modulations. For instance you can modulate the Panorama position via LFO 2 even if you have already set the Panorama to the far left position. In this case of course you will only hear the Panorama position shift to the right.



Velocity

Velocity is one of the preferred modulation sources of keyboard players. In the Virus you have ten modulation targets available for Velocity. Locate the **VELOCITY** section in the CTRL menu. There you will find the modulation intensities for

OSC 1 SHAPE
OSC 2 SHAPE
PULSE WIDTH
FM AMOUNT
FILT 1 ENV AMT
FILT 2 ENV AMT
RESONANCE 1
RESONANCE 2
VOLUME
PANORAMA

which you can manipulate independently of one another in the familiar bipolar control range.

TWIN MODE

When we talked about the oscillators, we mentioned that by subtly detuning signals, you can beef up sounds and achieve string-like sounds. The Virus is equipped with features that allow you to take this type of tonal manipulation a step further. On of these is the so-called TWIN MODE. It enables you to initiate two voices for each note played, which in turn lets you detune four main oscillators. TWIN MODE also offers the option of spreading the two voices generated by one note in the stereo panorama and shifting the phases of their LFOs so that all types of periodic effects can be used to produce an even more exciting signal.

Locate the parameter group **TWIN** in the EDIT menu. **TWIN MODE ON/OFF** does exactly what it says, it switches TWIN MODE off and on; **DETUNE** determines the relative pitch of both voices oscillators; **PAN SPREAD** lets you spread the two voices in the stereo panorama to determine the breadth of the stereo signal.

Please keep in mind that although the range of these options is impressive, you do have to pay a price in terms of versatility: TWIN MODE requires two voices to reproduce a note, so the total amount of notes that the Virus can generate simultaneously is halved.

The Chorus/Flanger Effect

Another function that delivers great effects based on pitch fluctuation is the so-called chorus effect. Chorus actually consists of a brief delay (generally up to approx. 50 ms) which is varied periodically. By modulating the delay, the delayed signal is slightly detuned to the input signal (the so-called Doppler effect). This inconsistency in pitch between the original and effects signal is the source of the chorus effect. Feedback in the delay line enhances this effect. The left signal side is automatically modulated in a different manner than the right, so a chorus effect is great for converting mono signals into stereo signals.

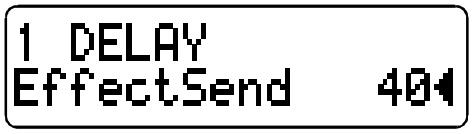
If the delay is less than approx. 10 milliseconds, than the effect is called flanging or a flanger effect rather than chorus. In this case feedback is even more significant because it generates resonances that can be modulated and is thus yet another source of radical sound effects. If you determine high feedback values, you can clearly hear how the two sides of the signal are modulated differently - in reverse phase - by the LFO.

Locate the parameter group **CHORUS** in the EDIT menu. **CHORUS DIR/EFF** determines the balance between the original signal and the processed signal. The parameters **RATE** and **SHAPE** control another LFO that was installed specifically for the chorus LFO. DELAY is used to set the delay time, **DEPTH** determines the modulation intensity, and **FEEDBACK** controls the feedback level.

Please keep in mind that the Chorus section in the Virus is fully stereophonic: Stereo positions as well as panorama modulations and stereo spread values that you have dialed in elsewhere remain intact in the effects signal.

The Delay Effect

A delay effect is traditionally used to generated an echo of the input signal. Locate the parameter group **DELAY** in the EDIT menu. Here you fill find parameters that are virtually identical to the parameters of the CHORUS group. Do not allow yourself to be confused by the slightly different terminology: The delay time is set via the parameter entitled **TIME** (equivalent to DELAY in the CHORUS section); the other features are **FEEDBACK** with a dedicated LFO and the familiar parameters **RATE**, **DEPTH** and **SHAPE**.



Only two functions in the Delay section are different to the Chorus section: For one, it features an **EFFECT SEND** instead of the balance parameter DIR/EFF. EFFECT SEND is especially significant in MULTI MODE, where several PARTs with different levels are patched through the same delay effect.
For the other, LENGTH enables you to create substantially longer delay times, for instance to achieve complete echoes (maximum of 693 ms) that are fully audible. The LFO allows you to modulate the delay as you would the chorus to achieve similar detuning effects. A stereo effect is achieved via different modulations of the left and right sides of the signal.

More to Come

We have come to the end of these detailed instructions for novices. We hope we were able to help you become a bit more familiar with your new synthesizer and gain some confidence in how to handle it. As we mentioned earlier, this is just an introduction and does not cover all the functions and features of the Virus, only the basic components and how they affect the sound of the Virus. You should now be able to come to terms with the in-depth look at the Virus in the following section.

COMPREHENSIVE OVERVIEW

This section of the manual deals with the basic operating modes of the Virus: SINGLE MODE and MULTI MODE. Then we ll take a look at the general handling and operation guidelines for the Virus. Finally you will be presented with a comprehensive list of all functions in the Virus with a brief explanation of each function.

OPERATING MODES

In the Virus you can select from two basic operating modes, SINGLE MODE and MULTI MODE. In SINGLE MODE, the Virus is able to generate a single sound program only. All voices, the Chorus and Delay effects and most importantly, all control features (with the exception of the MULTI button) function in conjunction with this one sound program. You might say a SINGLE program is a combination of all functions and effects that determine the sound of the Virus.

In MULTI MODE, the Virus can combine up to sixteen (SINGLE) sound programs, among which the maximum available number of voices (twelve) are allocated dynamically. All simultaneously available sounds can be manipulated in real-time; for this purpose the control panel enables you to switch among the sixteen so-called PARTS.
In MULTI MODE, the actual sound parameters are augmented with other functions that deal with how the involved SINGLE programs are structured or organized. These include the volume levels of the single programs, their MIDI channels, output assignments, etc. Additionally, all currently active sounds access the global Delay effect simultaneously. Consequently, the only parameter you need to determine separately is the effect amount per PART. All SINGLE parameters that apply to the Delay effect are ignored in the MULTI program, in other words, the MULTI program settings have priority.
Conversely, the Chorus effect is available four times in the MULTI program. Consequently, you can dial in individual Chorus settings for the first four PARTS in a MULTI program. In other words, for these four parts the SINGLE program settings have priority. Any SINGLE Chorus settings for the remaining twelve SINGLE programs are ignored.

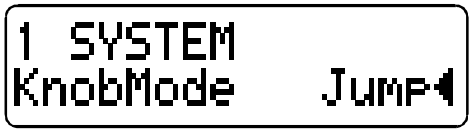
Another special feature of the Virus is that the sound programs allocated to a MULTI program can not only be played in parallel - much in the manner of several independent synthesizers, but individual MULTI parts also have the capability of processing external audio signals as well as other MULTI parts. For this purpose, the Virus is equipped with two virtual stereo aux paths called Subgroups. Instead of the oscillators, the external audio inputs or an aux path can be routed through the sound-shaping elements (filters, saturation stage, amplifier and panorama) of every PART of a MULTI program. Additionally, the PARTs - and the Delay effect - can not only be routed to any desirable audio outputs, but also through the internal aux paths. The aux paths are designed to be totally variable so that any number of PARTs can be routed via an aux path and mixed to the master signal. And the signal routed via an aux path can be accessed in parallel by any number of PARTs. (See INPUT SELECT, OUTPUT SELECT.)

OPERATING CONVENTIONS

Parameter Selection and Data Entry

In the Virus, we distinguished between two types of parameters. On the one hand, it features parameters that are essential in generating or synthesizing sounds, on the other hand it has sound parameters and organizational parameters that are more of a peripheral nature. This distinction is apparent in handling and operation of the Virus: All essential sound parameters feature a dedicated knob or button so that you can access these directly - especially while you are playing!. In just a few cases (where appropriate or where it facilitates better handling), the control features have dual functions.
The peripheral parameters are in turn allocated to so-called menus.
The primary menus are the EDIT and CTRL (abb. for Control) menus, but you also have some local menus available such as FILT ENV MOD. A menu can be accessed via the corresponding button. Once you have opened a menu, you can scroll through the parameters that are available there via the PARAMETER buttons and adjust them via the VALUE buttons and knobs. In local menus you also have the option of scrolling through the parameters contained therein by repeatedly pressing the corresponding menu button.

KNOB MODE



For all knobs with the exception of MASTER VOLUME, you can select from four operating modes in the CTRL menu. These are located under the menu item KNOB MODE:

OFF The knobs are inactive.

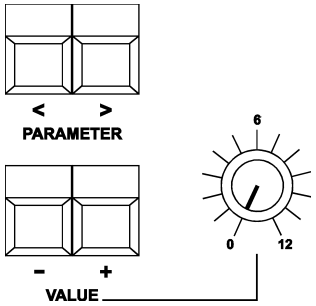
JUMP In ump Mode, the parameter jumps directly and absolutely to the value determined by the current position of the knob.

SNAP When you adjust a knob In Snap Mode, the original setting determines the value until the point where the movement of the knob passes beyond this position. In other words, the parameter does not jump to the value as in UMP Mode. However, keep in mind that your adjustments have no effect on the parameter until the knob snaps on at the position equivalent to the original value.

RELATIVE When you adjust a knob in RELATIVE Mode, the parameter is affected immediately but not absolutely. In other words, the value change from the original value to the value reflects precisely the amount you adjusted via a given control. Generally this operating mode allows you to adjust a parameter immediately, without radical jumps. However, the down side is that in an unfavorable configuration - the worst-case scenario being a maximum parameter value and a knob position at the minimum value - you do not have the full control range of the knob at your disposal. To counteract this situation, you have to turn the knob in the opposite direction to adjust the physical knob position so that it is equivalent to the actual parameter value.

The PARAMETER buttons provide access to the parameters in the EDIT, CTRL and local menus. Simply press the corresponding button to scroll through the parameters in the desired direction. If you press and hold a PARAMETER button and simultaneously press the other PARAMETER button, the menu scrolls through groups in the direction of the button you are holding down so that you can comfortably select from all oscillator-related parameters and all filter-related parameters. After you have scrolled through a functional group, select the desired parameter by pressing the button repeatedly rather than holding it down.

The VALUE /- buttons let you change the value of a parameter in steps. When you hold one of these buttons down, the value changes automatically and the longer you hold the button, the faster the pace of the value change. You can increase this pace even further by pressing and holding one VALUE button and simultaneously pressing the other VALUE button. If you press and release both VALUE buttons simultaneously, the parameter value is set to 0. This pertains to unipolar parameters (value range of 0 to 127) as well as bipolar parameters (value range of -64 to 63).



You can also use the VALUE knob to change the value of the selected parameter. The VALUE knob responds to the KNOB MODE settings as described in the paragraph above.

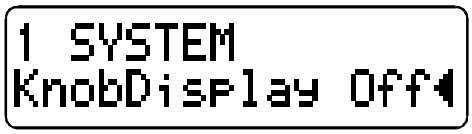
The buttons located in the diverse sections on the control panel that are bordered off (OSCILLATORS, FILTERS, etc.) have different functions. Some of these buttons activate the feature indicated by the label, e.g. SYNC and ENV MODE. Others are used to select different options indicated by LEDs, e.g. FILTER ROUTING and (LFO)SHAPE. And a third type of buttons opens the local menus that we mentioned earlier.
In the local menus, the corresponding LEDs illuminate continually once you have dialed in a value other than 0.

Display of Numeric Parameter Values

Numeric parameters which are accessed via the CTRL, EDIT or local menus and are controlled via the VALUE buttons and knob rather than by a dedicated knob appear in the display in numeric form. This number indicates the current value. If KNOB MODE in the CTRL menu is set to SNAP, then an arrow symbol appears to the right of the number. It indicates in which direction the VALUE knob must be turned to exceed the current parameter value.

In RELATIVE Mode, the triangle to the right of the number indicates if the VALUE knob coincides with the parameter value (solid triangle) or not (blank triangle).

When a menu is active, two display options are available for parameters with a dedicated knob. These can be selected under the menu item KNOB DISPLAY in the CTRL menu:



OFF Knob movements are not displayed; the current contents of the display remain intact when you turn a knob.

SHORT When you turn a knob, the current contents of the lower display line are briefly overwritten by data representing the change in parameter value; once the action is completed, the original contents reappear in the lower display line.

LONG Same as SHORT, except that - you guessed it - the display shows the knob data for a longer period of time.

ON The contents of the display are overwritten when you turn a knob; the original menu does not reappear in the display.

Knob parameters are indicated via two numbers and a triangle, the position of which vary according to the KNOB MODE setting (see above). Here are the rules:

1. The number at the right always represents the physical position of the knob. Exception: In RELATIVE MODE the number indicates the actual parameter value, a parameter value change which in this mode is immediate and seamless.

2. The number at the left represents the value stored in the sound program, i.e. it tells to which position you have to turn the knob to return it to the original value. Exception: In SNAP MODE a value is displayed on the left hand side. You must turn the knob beyond this value to initiate a parameter change. This value is identical to the current sound program s original setting unless an incoming MIDI message addressed to this parameter was received after the sound program was activated.

3. The triangle always indicates which of the two numbers is currently valid, in other words, the value that is actually implemented by the Virus sound generators. In UMP and RELATIVE MODEs, this is always the number at the right, while in SNAP MODE the triangle jumps from the left hand side to the right as soon as the valid parameter value is exceeded. In RELATIVE MODE an empty triangle indicates that the knob setting and the parameter value are not identical. When the setting and the value are identical (for example when the knob is set to the far left or right) the triangle is shaded black.

Operating Modes

In the Virus, we distinguished between two basic operating modes: SINGLE MODE and MULTI MODE. This distinction of course has a bearing on the contents of the menus: If the LED of the SINGLE button is illuminated, then the CTRL and EDIT menus provide access to the sound parameters of the current SINGLE PROGRAM; if the LED of the MULTI button is illuminated, then the CTRL and EDIT menus provide access to the organizational parameters of the current MULTI PROGRAM, for instance the selection of SINGLE PROGRAMs for each of the 16 MULTI PARTs. Please keep in that MULTI PROGRAMs only administrate the SINGLE PROGRAMs contained therein, so you must store these SINGLE PROGRAMs separately in the SINGLE banks.

MULTI SINGLE MODE
All involved SINGLE PROGRAMs can be edited within the MULTI PROGRAM. For this purpose, you must activate the so-called MULTI SINGLE MODE by simultaneously pressing the MULTI and SINGLE buttons so that both LEDs illuminate. Then you can switch among PARTs to process them via the PARAMETER buttons; the menus CTRL and EDIT provide access to the SINGLE parameters of the selected PART. Here the EDIT menu features additional organizational parameters, for instance PART VOLUME. The PARAMETER buttons in the EDIT and CTRL menus are already used as the parameter activation tools, so here you have to press and hold the MULTI button and use the VALUE buttons or the VALUE knob to select a new PART.

MULTI SINGLE MODE enables direct access to the 16 PARTs, so it is the preferred operating mode for use with a sequencer.
SINGLE MODE and MULTI MODE in turn are well-suited for activating and editing individual sound programs (SINGLE) and combination sounds (MULTI).

The STORE Modes

The mode structure of SINGLE, MULTI and MULTI SINGLE MODE is mirrored in the STORE functions: In SINGLE MODE, STORE saves the current SINGLE PROGRAM; in MULTI MODE, STORE saves the current MULTI PROGRAM; and in MULTI SINGLE MODE, the SINGLE PROGRAM of the current PART is stored.

The STORE process is always the same regardless of the operating mode: Press STORE. You then gain access to the STORE menu. There you can use the PARAMETER buttons to move among the individual letters in the lower name entry line and the number of the destined memory location as well as the bank number in the upper line. Use the VALUE button to make entries. The term in the upper display line indicates the name of the memory location which you will overwrite when you store the program.
Once all of the entries correspond to the data you have in mind, press STORE again to conclude the process and return to the previously active operating mode of the Virus. If for whatever reason you change your mind and want to cancel the operation, simply press SINGLE or MULTI to return to the previous operating mode without storing the program.

Controller Assignments

Virtually all of the parameters in the Virus are accessible via MIDI. For instance, you can record a knob adjustment to a sequencer and have the Virus play it back later. MIDI Controllers are great for these types of remote control operations because - in contrast to system exclusive data - they feature very fast throughput (data transfer rate) and can be processed via graphical tools in the vast majority of popular sequencer programs. Unfortunately you only have 128 Controller numbers at your disposal per MIDI channel, so not all parameters of a Virus PART can be covered by Controllers.

In the Virus, this problem is solved by subdividing its parameters into three Parameter PAGEs for data transmission purposes.
Each of these three PAGEs contains up to 128 parameters.
A SINGLE PROGRAM consists of the parameters on the first two first PAGEs. Parameters on the first PAGE are assigned to MIDI Controllers and parameters on the second PAGE are sent and received via so-called PolyPressure data. The structure of this data type is identical to the structure of Controllers and is also supported by sequencer programs. (This data type was originally created to transmit the polyphonic pressure data of keyboards, but the requisite playing technique wasn t a big hit with keyboard players. The Virus is the first instrument to use this data type as additional Controllers.)

This form of sound control is exceptionally simple, reliable and versatile, but it does have its disadvantages: For instance the Virus enables you to control several PARTs via the same MIDI Channel so that theoretically an incoming Controller should control the parameter in question for all involved PARTs. This of course doesn t make a great deal of sense since one of the reasons you are using several PARTs on a single channel is it that you can double up on different sounds. Consequently, the Virus has a convention dictating that in the case of several PARTs on a single MIDI Channel, only the PART with the lowest PART number of all incoming Controllers is addressed; all other PARTs ignore these data.

As an alternative to parameter control via Controllers and PolyPressure, you have conventional system exclusive data available for control purposes (see the MIDI Implementation in the Appendix). The first two Parameter PAGEs can be switched independently to system exclusive control (under MIDI in the CTRL menu).
With the third Parameter PAGE, you can control the parameters of the current MULTI PROGRAM as well as the global or system parameters. This third PAGE is addressed via system exclusive MIDI Messages only.

In addition to direct assigning parameters directly to Controllers/PolyPressures, the Virus offers another option for real-time control, the three so-called CONTROLLER ASSIGNs. Each CONTROLLER ASSIGN features a Controller input (SOURCE). ASSIGN 1 has a modulation destination (DESTINATION) with variable Intensity (AMOUNT). ASSIGN 2 can address two DESTINATIONs via independent AMOUNTs. ASSIGN 3 also addresses DESTINATIONs via independent AMOUNTs. You will find a list of available SOURCEs and DESTINATIONs in the Appendix of this manual.

The ASSIGNs serve several purposes: First of all, they enable you to assign a Controller, for instance the modulation wheel of a master keyboard, to a specific parameter. You can also limit the control range of a Controller or invert it so that only this narrowly-defined range of values of the destination parameter is affected. And finally, the ASSIGNs allow you to control several parameters simultaneously with different intensities and polarities via the same Controller, for instance so that a single adjustment of the modulation wheel initiates complex sound modulations. If the three DESTINATIONs of ASSIGN 3 are insufficient for this purpose, you have the option of assigning the same control to the other two ASSIGNs so that you can control a maximum of six parameters simultaneously.

EDIT MODE

The number of available sound parameters are increased substantially by activating EXPERT MODE. You can access EXPERT MODE via the EDIT menu. Once you have activated EXPERT MODE, you have access to many more parameters, some of which you may never have encountered before. These parameters require a bit more attention and time to work with, so we devised EXPERT MODE to distinguish these from the more conventional parameters accessible in standard operating mode.

THE PARAMETERS

The following section lists all parameters in the Virus, each with a brief definition or explanation. This list is subdivided into:

Sound parameters with a dedicated control element and an entry in local menus

Sound parameters in the EDIT menu

Sound parameters in the CTRL menu

Global Parameters/MIDI Parameters/System Parameters

MULTI parameters in the EDIT menu

MULTI parameters in the CTRL menu

For the purpose of clarity, we ordered the parameters with a dedicated control element according to the module you will find it in.

Menu parameters are listed in order of appearance. Menu parameters that are available in EXPERT MODE only are identified by an (EX).

Sound Parameters with a Dedicated Control Element

MASTER VOLUME
Controls the overall volume of the Virus.

DEFINABLE 1/2
These two knobs are freely definable. You can define the knobs via the CTRL menu (DEFINABLE 1/2 MODE and List; see appropriate section). Settings can be saved globally as well as individually to SINGLE program slots.

TRANSPOSE
Transposes the entire SINGLE sound by octaves.

LFO 1

RATE
Determines the speed or rate of the LFO.

In polyphonic sounds, the manually selected RATE value deviates slightly from voice to voice to liven up the sound of the LFOs, which also oscillate polyphonically.

SHAPE
Determines the waveshape of the LFO. You can select from a triangle, sawtooth or pulse wave as well as an incremental random modulation (S H; abb. for Sample Hold) or a continual random modulation (S G; abb. for: Sample Glide). When EXPERT MODE is active, you have the option of setting an infinitely variable triangle symmetries in the EDIT menu (LFO 1 TRI SYMMETRY, see appropriate

section), including everything from a descending sawtooth to a conventional triangle and on to an ascending sawtooth.

KEY FOLLOW
Activates a function in which the LFO frequency is controlled via the note number. When EXPERT MODE is active, you have the option of setting the control intensity in the EDIT menu under LFO 1 KEY FOLLOW AMT (see appropriate section).

ENV MODE
Activates an operating mode in which the LFO oscillates like an envelope: The LFO cycles once only following the start of the note; the response of the LFO shifts from bipolar to unipolar.
If the LFO waveshape S H (Sample Hold) is active, then the LFO is assigned a new random value with each new note. This new value is valid for the entire duration of the note.

AMOUNT

This button does not actually control a parameter, it opens a local menu. This menu contains independent modulation intensities for controlling the following parameters via LFO 1:

OSC 1 Pitch of Oscillator 1

OSC 2 Pitch of Oscillator 2

PW 1+2 Both pulse widths jointly

RESO 1+2 Both filter resonances

FILT GAIN Input level of Filter 1

FILT GAIN also has an influence on the post-filter saturation stage - although without the level compensation controlled via OSC VOL (see appropriate section). The effect of a FILT GAIN modulation is a periodic change in the saturation level which is linked to a corresponding tremolo (periodic change in volume). If the signal is not saturated in any manner, then the only audible result is a tremolo effect.
While you are dealing with one of the parameters discussed here, the corresponding LED will flash. If this parameter is assigned a value other than 0, it will illuminate continuously when you exit the menu.

Between the two positions of OSC 1 and OSC 2 you will find the position OSC 1 2, which lets you jointly control the modulation intensities of both oscillators. In this position, the OSC 1 and OSC 2 LEDs flash.

LFO 2

RATE
Same as LFO 1; see paragraph above.

SHAPE
Same as LFO 1; see paragraph above.

KEY TRIGGER
Activates the synchronization of the LFOs at the start of a note: The LFO no longer oscillates freely, it restarts its wave cycle at the beginning of each note.
With the function KEY TRIG PHASE in the EDIT menu, you can select the position within the wave cycle at which you want the LFO to start oscillating at the start of a note.

ENV MODE
Same as LFO 1; see paragraph above.

AMOUNT

This button does not actually control a parameter, it opens a local menu. This menu contains independent modulation intensities for controlling the following parameters via LFO 2:

SHAPE 1+2 The SHAPE parameters of both oscillators jointly

FM AMOUNT The Frequency Modulation Intensity

FILTER 1 The frequency of the first filter

FILTER 2 The frequency of the second filter

PAN Panorama position

While you are dealing with one of the parameters discussed here, the corresponding LED will flash. If this parameter is assigned a value other than 0, the LED will illuminate continuously when you exit the menu.
Between the two positions FILTER 1 and FILTER 2 you will find the position FILTER 1 2, which lets you jointly control the modulation intensities of both oscillators. In this position, the FILTER 1 and FILTER 2 LEDs flash.

OSCILLATOR 1

SHAPE
This control feature lets you determine the waveshape for the WAVE section (one of 64 variable waveshapes). The waveshape is infinitely variable from sawtooth through to pulse waves. Wave or pulse width selection is executed via the SHAPE and WAVE SEL/PW control features (see appropriate section): If SHAPE has a value less than the value of the center position, then WAVE SEL/PW determines the waveshape; if the SHAPE value is higher than that of the center position, then WAVE SEL/PW determines the pulse width.

WAVE SEL/PW
WAVE SEL/PW has two functions, depending on the SHAPE (see appropriate section) value:

1. When SHAPE has a value lower than that of the center position, then WAVE SEL/PW lets you select from the 64 waveshapes available in the ROM of the Virus. Waveshape 1 is a sine wave; No. 2 a triangle, the remainder of the waves feature different combinations of frequencies.

2. When the SHAPE value is higher than that of the center position, then WAVE SEL/PW determines the pulse width: At the far left position the pulse width is 50 , at the far right it is 0 , which means the wave no longer oscillates.

OSCILLATOR 2

SHAPE
Same as OSCILLATOR 1; see paragraph above.

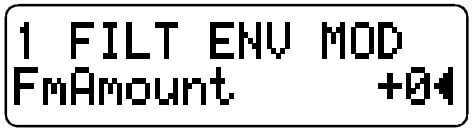
WAVE SEL/PW
Same as OSCILLATOR 1; see paragraph above.

SEMITONE
Determines the interval between the second oscillator and the first oscillator: Control range /-48 semitones, assigned in semitone steps.

DETUNE
Detunes the second oscillator relatively to the first. With this parameter, you can dial in everything from slight deviations in pitch to major fluctuations between the two oscillators.

SYNC
Synchronizes the second oscillator with the first: The SYNC function forces Oscillator 2 to interrupt its wave cycle and restart it at the same time as Oscillator 1 starts its cycle. The effect of this measure is that pitch deviations and intervals are no longer audible as such; what you hear are tonal modifications: Repeated interruption of the Oscillator 2 wave cycle generates new tonal spectra with a great deal of overtone content. The tone of a given spectrum can be influenced via the SEMITONE knob, among other control features.

FILT ENV MOD
This button does not actually control a parameter, it opens a local menu. This menu contains independent modulation intensities for controlling the pitch of the second oscillator (OSC 2 PITCH) and the intensity of the frequency modulation (FM AMOUNT).



If either of these parameters is assigned a value other than 0, the LED of the FILT ENV MOD button will illuminate continuously.

FM AMOUNT
Controls the frequency modulation intensity of the second oscillator by the first. Depending on the selected FM AMOUNT and the interval between the oscillators, the frequency modulation generates everything from slightly to radically enriched spectra. The modulation waveshape of the first oscillator is - regardless of the selected waveshape - always a triangle.
In the Virus you have the option of combining the two functions called oscillator synchronization (SYNC) and frequency modulation (FM AMOUNT) to generate new harmonic spectra.

MIXER

OSC BAL
Determines the balance between the Oscillators 1 and 2 volume level.

SUB OSC
Determines the volume level of the SubOscillator.

OSC VOL
This knob has two functions:

1. In the left half of its control range up to the center position (MIDI value 64), OSC VOL determines the master volume of the three oscillators prior to the filter section input. The fourth voice-internal signal source, the Noise Generator, is not affected by the master volume knob OSC VOL. The level of the Noise Generator is controlled separately via NOISE VOLUME in the EDIT menu (see appropriate section)

2. In the right half of the control range from the center position to the far right, OSC VOL increases the saturation intensity (Gain) for the input of the SATURATION stage (see appropriate section); however this adjustment is compensated post-SATURATION stage so that when you adjust the gain you are not actually increasing the volume, only manipulating the tonal spectrum in terms of saturation.

FILTERS

CUTOFF
Determines the cutoff frequency of Filter 1 and 2 (with exceptions; see CUTOFF 2).

RESONANCE
Controls the resonance (also called filter feedback or factor). Depending on the FILT SELECT setting, RESONANCE affects the first filter, the second filter or both filters.

ENV AMOUNT
Determines the modulation intensity of the cutoff frequency filter envelope. Depending on the FILT SELECT setting, ENV AMOUNT affects the first filter, the second filter or both filters. In contrast to virtually all other modulation intensity parameters in the Virus, ENV AMOUNT is a unipolar parameter. The polarity of the modulation can be changed individually for each filter via the FILTER ENV POLARITY function in the EDIT menu.

KEY FOLLOW
Determines the extent to which the filter frequency follows the pitch (Note Number) and the Pitch Bend. Depending on the FILT SELECT setting, KEY FOLLOW affects the first filter, the second filter or both filters. The function uses C 1 (MIDI Note Number 36) as a neutral starting point or base note: Regardless of the KEY FOLLOW value, the filter frequency is not influenced at this pitch. When EXPERT MODE is active, you have the option of freely defining the base note under KEYTRACK BASE in the EDIT menu.

FILTER BALANCE
Has different functions depending on the FILTER ROUTING setting (see appropriate section): In the parallel FILTER ROUTING operating modes PAR 4 and SPLIT, it controls the balance of volume levels between the two filters - or in actuality SATURATION and Filter 2.
Technically, in the serial FILTER ROUTING operating modes SER 4 and SER 6, the left half and the right half of the control range address different parameters: When the knob is set to the far left position, you will hear Filter 1/Saturation exclusively, whereas Filter 2 is blended into the mix as you rotate the knob

towards the center position. From the center position towards the far right, Filter 1/Saturation is blended out of the mix so that the signal is routed through Filter 2 only. Consequently, you must set FILTER BALANCE to the center position if you want both filters in series (in equal amounts) in the signal path.

CUTOFF 2
Controls the cutoff frequency of Filter 2. Normally, CUTOFF 2 does not operate absolutely, but relatively to CUTOFF: The cutoff frequency of the second filter is subordinate to the CUTOFF value you determined for the first filter. However you can use the CUTOFF 2 knob to dial in a relative /- deviation in frequencies, i.e. a higher or lower frequency. When you set CUTOFF 2 to the center position, both filters have the same CUTOFF frequency. in EXPERT MODE, you can access FILTER 2 CUTOFF LINK ON/OFF to sever the link between CUTOFF and CUTOFF 2. In this case the two knobs CUTOFF and CUTOFF 2 are independent cutoff controls for Filters 1 and 2, respectively.

SATURATION
Controls the distortion curve for the post-Filter 1 saturation stage. In addition to the OFF (no saturation) option, you can select from several distortion curves with different saturation intensities. After you press SATURATION, you can now select from a number of saturation/distortion curves via with VALUE buttons or the VALUE knob. Once you have selected a curve, the SATURATION LED illuminates continually. The saturation affect is influenced by the shape of the curve, the tone of the input signal and the input level as determined by OSC VOL (see appropriate section).

FILT 1 MODE
FILT 2 MODE
Selects the operating mode of the indicated filter:

LP The low pass filter suppresses frequencies higher than the CUTOFF frequency (see appropriate section) and allows the lower frequencies through.

HP The high pass filter works in the opposite manner of the low pass filter: It suppresses the lower frequencies in a signal and lets the higher frequencies pass.

BP The band pass filter suppresses both ends of the tonal spectrum and allows only a narrowly defined bandwidth of the original sound to pass.

BS The band stop filter, band reject filter or notch filter works in the opposite manner of the band pass filter. It allows all of the frequencies of a signal except for a narrow frequency band around the cutoff to pass. The term notch is fairly descriptive; you might say this filter chops a notch out of the sound spectrum.

FILTER ROUTING
This feature offers four filter routing options which allow you to operate the filters in series or in parallel:

SER 4 The filters are switched in series; with two poles each, both filters have the same slope for a total of four filter poles.

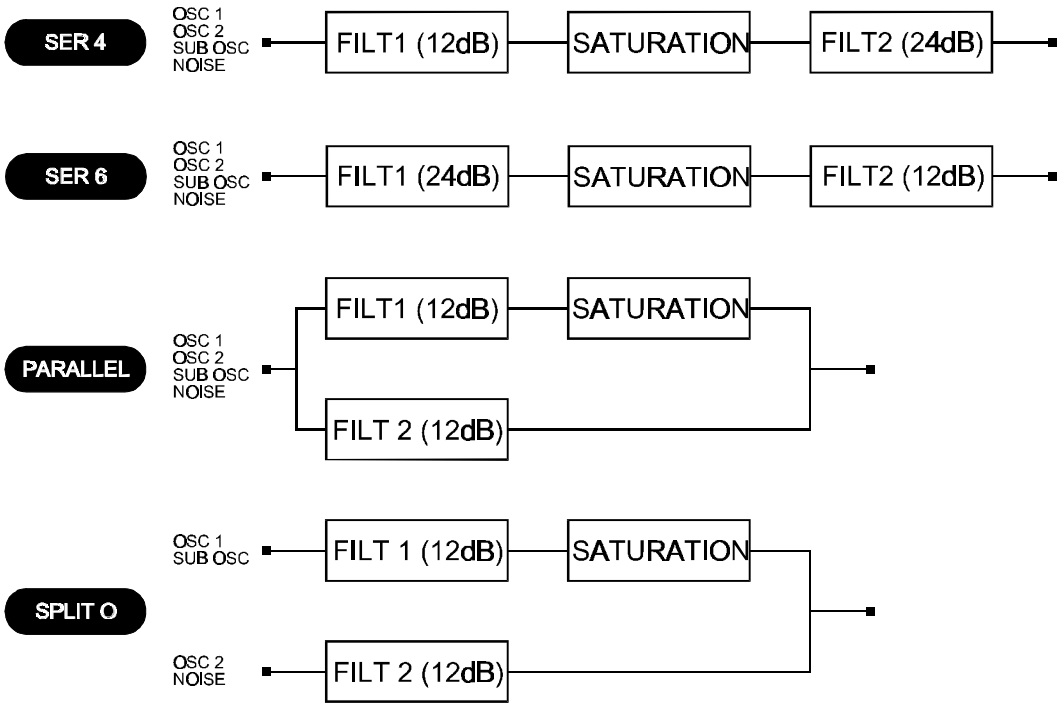
SER 6 The filters are switched in series; Filter 1 has four poles, Filter 2 has two poles so the overall slope is equivalent to six poles.

PAR 4 The filters are switched in parallel and feature two poles each.

SPLIT The filters are switched in parallel and feature two poles each. Additionally, they receive independent input signal s (more on this later). The stereo position of the signals can also

be manipulated via the parameter TWIN MODE PAN SPREAD (see appropriate section) in the EDIT menu.

FILTER ROUTING



Regardless of which FILTER ROUTING option you chose, the SATURATION stage is always post-Filter 1.

FILT 1 SELECT
FILT 2 SELECT
This control feature is used to allocate the three knobs RESONANCE, ENV AMOUNT and KEY FOLLOW to the first filter, second filter or both filters. The currently active assignments are indicated by the integrated LEDs. To control both filters simultaneously via the knobs, you must first press both buttons simultaneously. SELECT pertains to the corresponding knob located on the Virus only, but not to the sound parameters it controls. These parameters exist separately in both filters regardless of the SELECT setting. This is why for instance you should control the resonances of the respective filters via different MIDI Controllers. In actuality SELECT only determines if the knob in question sends its value to the first filter, second filter or both filters.

ATTACK
Determines the amount of time it takes for the filter envelope to rise to its maximum level. The higher the ATTACK value, the longer it takes for the envelope to rise to maximum volume after the start of a note.

DECAY
Determines the amount of time it takes for the filter envelope to fade out. The higher the DECAY value, the longer it takes for the envelope to fall from its peak level to the SUSTAIN value.

SUSTAIN
Determines a variable level for the filter envelope at which it remains after the end of the DECAY phase (see appropriate section). The duration of the SUSTAIN phase depends on the TIME value (see appropriate section).

TIME
Sets the bipolar time parameter for the filter envelope. It determines the envelope s response once it reaches the SUSTAIN phase (see appropriate section): If the knob is set to the center position (12 o clock) indicated by the mathematical infinity symbol, then the SUSTAIN level remains constant through to the end of the note; if you turn it counter-clockwise to the left (towards FALL), then the level drops off at an increasing rate towards the minimum level; If you turn the knob clockwise to the right (towards RISE), the level rises at an increasing rate to maximum.

RELEASE
Determines the speed or rate at which the volume of the filter envelope decreases after the end of a note. The higher the DECAY value, the longer it takes for the envelope to fall from its current level to the minimum level.

AMPLIFIER

ATTACK
Determines the amount of time it takes for the amplifier envelope to rise to its maximum level. The higher the ATTACK value, the longer it takes for the envelope to rise to maximum volume after the start of a note.

DECAY
Determines the amount of time it takes for the amplifier envelope to fade out. The higher the DECAY value, the longer it takes for the envelope to fall from its peak level to the SUSTAIN value.

SUSTAIN
Sets a variable level value for the amplifier envelope at which it remains after the end of the DECAY phase (see appropriate section). The duration of the SUSTAIN phase depends on the TIME value (see appropriate section).

TIME
Sets the bipolar time parameter for the amplifier envelope. It determines the envelope s response once it reaches the SUSTAIN level (see appropriate section): If the knob is set to the center position (12 o clock) indicated by the mathematical infinity symbol, then the SUSTAIN level remains constant through to the end of the note; if you turn it counter-clockwise to the left (towards FALL), then the level drops off at an increasing rate towards the minimum level; If you turn the knob clockwise to the right (towards RISE), the level rises at an increasing rate to maximum.

RELEASE
Determines the speed or rate at which the volume of the amplifier envelope decreases after the end of a note. The higher the DECAY value, the longer it takes for the envelope to fall from its current level to the minimum level.

Sound Parameters in the EDIT Menu (Single)

EDIT MODE

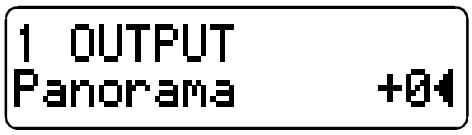
Switches between EXPERT MODE and EASY MODE. Menu parameters that are only available in the EXPERT MODE are identified in the following section by an (EX).

OUTPUT

PATCH VOLUME

Storable master volume for the SINGLE program. Its nominal value is set to 100 so that you have a reserve of 27 volume increments when you are dealing with exceptionally low-level sound settings. PATCH VOLUME is not identical to the MIDI Standard Volume Controller 7. In MULTI MODE, you can also access PART VOLUME (see appropriate section), which provides further volume reserves (headroom).

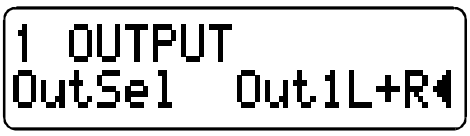
PANORAMA



Determines the Panorama position of the SINGLE program.

OUTPUT SELECT

This PART parameter is a MULTI MODE parameter and is stored along with the current MULTI PROGRAM. Consequently, it is available in MULTI MODE. It is also available in the SINGLE CTRL menu when MULTI SINGLE MODE is active. Why Because it comes in handy when you are working with sequencers.



This control feature is used to select the external or internal output of the PART. You can chose from:

OUT 1 L The left jack of dual Output 1 (mono)

OUT 1 L+R Both jacks of dual Output 1 (stereo)

OUT 1 R The right jack of dual Output 1 (mono)

OUT 2 L The left jack of dual Output 2 (mono)

OUT 2 L+R Both jacks of dual Output 2 (stereo)
OUT 2 R The right jack of dual Output 2 (mono)

OUT 3 L The left jack of dual Output 3 (mono)

OUT 3 L+R Both jacks of dual Output 3 (stereo)

OUT 3 R The right jack of dual Output 3 (mono)

AUX 1 L The left channel of internal Aux 1 (mono)

AUX 1 L+R Both channels of internal Aux 1 (stereo)

AUX 1 R The right channel of internal Aux 1 (mono)

AUX 2 L The left channel of internal Aux 2 (mono)

AUX 2 L+R Both channels of internal Aux 2 (stereo)

AUX 2 R The right channel of internal Aux 2 (mono)

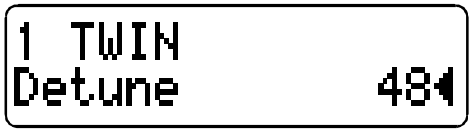
If the selected output is monophonic, then the Panorama settings and modulations in the sound program are inactive.
When you select an internal aux path as a signal output, you of course must route the signal of another PART to this aux path via INPUT SELECT before you can establish a signal connection between the two PARTS. Several PARTs can simultaneously access the external input or the internal aux paths via OUTPUT SELECT.
In SINGLE MODE, OUTPUT SELECT does not appear in the menu; in this case Output 1 (stereo) is preset.

TWIN

MODE

Activates TWIN MODE. In this case, two voices are initiated for each incoming MIDI note.
In conjunction with the other TWIN parameters, this feature delivers a livelier, fatter sound. However, in TWIN MODE the number of available voices is halved.

DETUNE



Detunes the two TWIN MODE voices.

PAN SPREAD

Stereo panorama spread of the two TWIN MODE voices.
PAN SPREAD also determines the stereo spread of the two filters when the FILTER ROUTING (see appropriate section) option SPLIT is active.

LFO PHASE (EX)

Shifts the phases of the two TWIN MODE voices LFOs relatively. This effect livens up modulations. The value range of -64 to 63 is equivalent to -180 to 177 degrees. LFO PHASE pertains to all LFOs and does not impair the phase response of the LFOs within either of the two voices.

CHORUS

ATENTION: in MULTI MODE, only the first four PARTs are assigned Chorus. Consequently the following parameters have no bearing on PARTs 5 through 16.

DIR/EFF

Controls the balance of volume levels between the direct signal and the Chorus signal: At a value of 0, only the direct signal is audible, at a value of 127, only the Chorus output signal is audible. The values between these two extremes determine the mix of the two signals.

RATE

Determines the speed of the Chorus LFO.

DEPTH

Controls the intensity of the delay modulation by the LFO.
The LFO modulates the left and right sides of the Chorus signal antiphase, which generates a true stereo effect.

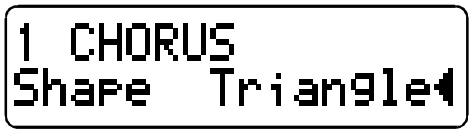
DELAY

Controls the delay time of the Chorus.

FEEDBACK

Controls the amount of feedback in the Chorus.

SHAPE (EX)

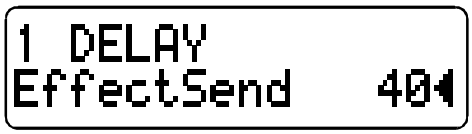


Determines the waveshape of the Chorus LFO. You can select from sine, triangle, sawtooth, pulse, S H (abb. for: Sample Hold) and S G (abb. for: Sample Glide) waves.

DELAY

In SINGLE MODE, all Delay settings apply to the SINGLE PROGRAM in the conventional manner and are stored along with the program.
However in MULTI MODE, all 16 PARTs access the same Delay effect. In this case, the only dedicated parameter you have available for each part is EFFECT SEND; all other Delay parameters apply to the same Delay unit and affect all PARTs.
Consequently, if you set the Virus to MULTI MODE or MULTI SINGLE MODE, all settings you dial in for the Delay (including EFFECT SEND) affect the MULTI PROGRAM and are stored along with it. If the Virus is in MULTI MODE or MULTI SINGLE MODE and you activate a new SINGLE, the Delay parameters of the SINGLE are ignored and the Delay parameters of the current MULTI PROGRAM are activate.
As a rule, in MULTI MODE all SINGLE settings pertaining to the Delay are ignored, with the exception of EFFECT SEND.

EFFECT SEND

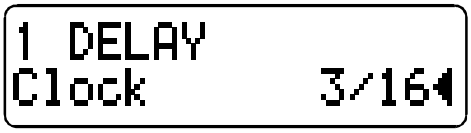


Controls the level at which the signal is patched through the Delay.
EFFECT SEND is equivalent to the post-fade effects loop of a mixing console.

TIME

Controls the delay time in Milliseconds (max. 693ms)

CLOCK



When you set it to OFF, the absolute delay time is determined in milliseconds. If you select a note value, then the delay time is set to the value of this note. The absolute length of this note value depends on the value entered to CLOCK TEMPO in the global clock generator (refer to this section). In this case, the absolute delay time in milliseconds is ignored.

If the delay time determined by the clock tempo exceeds the maximum value of 693 ms, then the delay time is automatically set to a value equivalent to half of the entered value.

FEEDBACK

Controls the amount of feedback of the Delay.

RATE

Determines the speed of the Delay LFO.

DEPTH

Controls the intensity of the delay modulation by the LFO.
Like the Chorus LFO, the Delay LFO modulates the left and right sides of the signal antiphase, which generates a true stereo effect.

SHAPE (EX)

Determines the waveshape of the Delay LFO. You can select from sine, triangle, sawtooth, pulse, an incremental random modulation (S H; abb. for Sample Hold) and a continual random modulation S G (abb. for: Sample Glide) waves.

PUNCH

INTENSITY

Here you can influence the attack of the amplifier envelope to enhance the sound with a more percussive, snappy kind of feel. You may have guessed that PUNCH INTENSITY determines the intensity of this effect. PUNCH is only effective when you have dialed in fairly short ATTACK rates for the amplifier envelope.

OSCILLATOR 1

WAVE (EX)

Selects among of 64 waveshapes. This parameter is identical to WAVE SEL/PW (see appropriate section) when SHAPE (see appropriate section) is set to the left half of its control range. However, in contrast to WAVE SEL/PW, WAVE is always available regardless of the current SHAPE setting.

SEMITONE (EX)

Transposes Oscillator 1 in semitone steps. Control range: /-4 octaves.

KEY FOLLOW (EX)

Determines the intensity of the pitch control via the keyboard: At the value 32 (standard setting) the oscillator is controlled normally, i.e. the octave you are playing is identical to the oscillator octave; at 63 every ascending octave you play transposes the oscillator upwards by two octaves (whole note scale); 15 transposes the oscillator upwards by one octave for every two ascending octaves you play (quarter note scale); at 0 the keyboard control option is off.

Negative values generate opposite control intensities.

OSCILLATOR 2

WAVE (EX)

Selects among of 64 waveshapes. This parameter is identical to WAVE SEL/PW (see appropriate section) when SHAPE (see appropriate section) is set to the left half of its control range. However, in contrast to WAVE SEL/PW, WAVE is always available regardless of the current SHAPE setting.

KEY FOLLOW (EX)

Determines the intensity of the pitch control via the keyboard: At the value 32 (standard setting) the oscillator is controlled normally, i.e. the octave you play is identical to the octave of the oscillator; at 63 every ascending octave you play transposes the oscillator upwards by two octaves (whole tone scale); 15 transposes the oscillator upwards by one octave for every two ascending octaves you play (quarter tone scale); at 0 the keyboard control option is off.
Negative values generate opposite control intensities.

OSCILLATORS PHASE INIT (EX)

This feature lets you select the oscillator phase position at the start of a note. At a value of 0, both oscillators oscillate freely much like in a traditional analog synthesizer. At values of 1 and higher, Oscillator 1 starts the note with a phase angle of 0, whereas the phase position of the second oscillator is shifted increasingly at ascending values. With this parameter, the attack phase of every note is identical, which is a handy feature for programming drums and percussive sounds.

SUB OSCILLATOR

WAVE

Switches the waveshape of the SubOscillator back and forth between S UARE and TRIANGLE.

NOISE

VOLUME

Controls the level of the Noise Generator. This volume level is independent of the parameter OSC VOL (see appropriate section)

FILTERS

FILTER 1 ENV POLARITY (EX)

Switches back and forth between positive (POS) and negative (NEG) ENV AMOUNTs for Filter 1 (see appropriate section).

FILTER 2 ENV POLARITY (EX)

Switches back and forth between positive (POS) and negative (NEG) ENV AMOUNTs for Filter 2 (see appropriate section).

FILTER 2 CUTOFF LINK (EX)

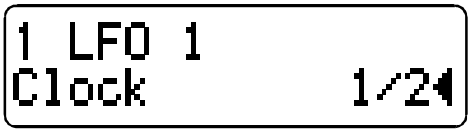
Switches the knob and the parameter CUTOFF 2 (see appropriate section) back and forth between two operating modes:
In operating mode ON, CUTOFF 2 operates relatively to the CUTOFF knob value rather than absolutely: The cutoff frequency of the second filter is - like the first filter - determined by the CUTOFF value. However you can dial in an offset (relative ascending or descending deviation) of the frequency via the CUTOFF 2 knob. At the center position (12 o clock) of CUTOFF 2, the frequencies of the two filters are identical.
In operating mode OFF, the CUTOFF and CUTOFF 2 knobs are no longer linked and CUTOFF 2 operates absolutely in a control range of 0 to 127. In this case the CUTOFF and CUTOFF 2 knobs are two independent control features that determine the respective cutoff frequencies for Filter 1 and 2.
CUTOFF LINK pertains exclusively to the CUTOFF 2 knob and the corresponding parameter. CUTOFF 2 has no influence on the other parameters of the second filter.

KEYFOLLOW BASE (EX)

This feature determines the base note for the filter KEYFOLLOW: When you press the key selected here, the filter frequency you determined manually has priority - i.e. it is not influenced in any manner - regardless of the KEY FOLLOW setting (see appropriate section) for the filters. As the interval between the KEYFOLLOW BASE value and the keys increases as you move up towards the higher end of the keyboard, the influence of KEY FOLLOW increases accordingly. KEYFOLLOW BASE affects both filters simultaneously.

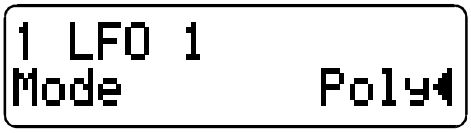
LFO 1

CLOCK (EX)



When you set it to OFF, the LFO oscillates in the normal manner, independently of the global clock generator (CLOCK TEMPO).
If you set it to a note value, then the wave cycle of the LFO is re-started - or more accurately, re-triggered (much like KEY TRIGGER) at intervals equivalent to the note value. The note value actually represents a fraction of a 4/4 beat. You can also set the tempo via CLOCK TEMPO (refer to the appropriate section) and synchronize it to external MIDI clock.

MODE (EX)

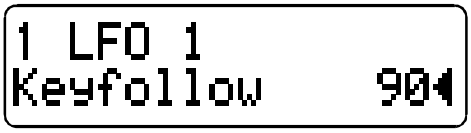


Switches back and forth between two LFO operating modes:

POLY In polyphonic mode, each of the voices involved is assigned a dedicated LFO. The LFOs oscillate in different phase positions for each voice.

MONO In polyphonic mode, all voices are assigned the same LFO.

KEY FOLLOW (EX)



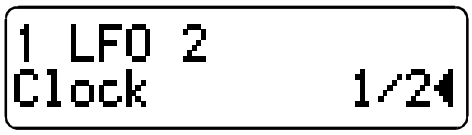
Controls the intensity of the KEY FOLLOW function - i.e. the rate at which the LFO follows the pitch of a played note. At a value of 0, KEY FOLLOW is deactivated. You can switch the KEY FOLLOW function off and on via the KEY FOLLOW button in the LFO 1 section.

TRI SYMMETRY (EX)

This is a bipolar parameter that influences the shape of the triangle wave: If TRI SYMMETRY is set to 0, the triangle wave oscillates in the conventional manner; as you set increasingly negative values, the symmetry of the wave s oscillation shifts towards the shape of a descending sawtooth; at increasingly positive values, the symmetry of the wave s oscillation shifts towards the shape of an ascending sawtooth.
When you use a triangle wave in ENV MODE (see paragraph above), a small envelope with an attack and a decay phase is generated. You can set the relative duration of these phases via TRI SYMMETRY. The overall duration of the envelope is set via the RATE knob.

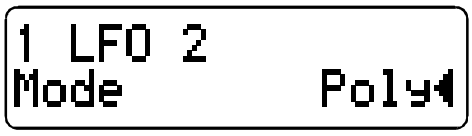
LFO 2

CLOCK (EX)



When you set it to OFF, the LFO oscillates in the normal manner, independently of the global clock generator (CLOCK TEMPO).
If you set it to a note value, then the wave cycle of the LFO is re-started - or more accurately, re-triggered (much like KEY TRIGGER) at intervals equivalent to the note value. The note value actually represents a fraction of a 4/4 beat. You can also set the tempo via CLOCK TEMPO (refer to the appropriate section) and synchronize it to external MIDI clock.

MODE (EX)



Same as LFO 1; see paragraph above.

KEY TRIG PHASE (EX)

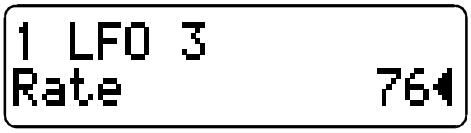
Selects the position in the wave cycle - i.e. the phase position - at which the LFO starts oscillating in response to the start of a note.
The control range of 1 to 127 is equivalent to phase positions of 0 to 180 degrees; the value 0 switches the KEY TRIGGER function completely off so that the LFO oscillates freely and assumes a random phase position at the start of a note.
You can switch the KEY TRIGGER function off and on via the KEY TRIGGER button in the LFO 2 section.

TRI SYMMETRY (EX)

Same as LFO 1; see paragraph above.

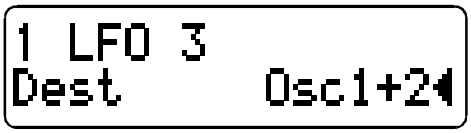
LFO 3

RATE



Determines the speed of the LFO.

DESTINATION



Determines the modulation destination of the LFO. You can select from:

OSC 1 The pitch of Oscillator 1

OSC 1+2 The pitch of both oscillators

OSC 2 The pitch of Oscillator 2

PW 1 The pulse width of Oscillator 1

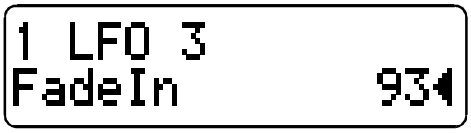
PW 1+2 The pulse width of both oscillators

PW 2 The pulse width of Oscillator 2

OSC AMOUNT

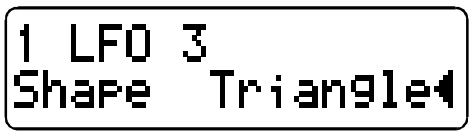
Controls the modulation intensity of the LFO.

FADE IN



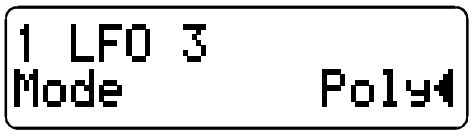
This parameter lets you automatically initiate a delayed fade-in the LFO3 modulation that you set up via OSC AMOUNT (see the section above). FADE IN controls the overall delay and fade-in time.

SHAPE (EX)



Determines the waveshape of the LFO. You can select from sine, triangle, sawtooth, pulse, S H (abb. for: Sample Hold) and S G (abb. for: Sample Glide) waves.

MODE (EX)

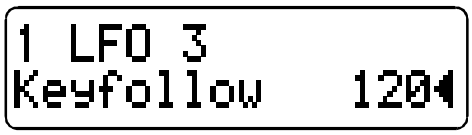


Switches back and forth between two LFO operating modes:

POLY In polyphonic mode, each of the voices involved is assigned a dedicated LFO.

SINGLE In polyphonic mode, all voices are assigned the same LFO.

KEY FOLLOW (EX)



Controls the intensity of the KEY FOLLOW function - i.e. the rate at which the LFO follows the pitch of a played note.

INPUT

In the Virus you have the option of using the external analog inputs instead of the internal oscillators as signal sources that can be processed by the filters, envelopes and the internal effects. In addition to the external analog inputs, you also have two internal stereo aux paths or subgroups available as signal sources in MULTI MODE. The output signals of other PARTs can be routed via their respective OUTPUT SELECTs (see appropriate section) to these aux paths.

INPUT MODE

You can chose from:

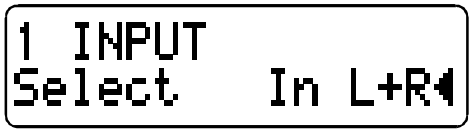
OFF The PART is not assigned an external input but works with its own sound sources (the oscillators and the Noise Generator) in the manner of a conventional analog synthesizer.

DYNAMIC Instead of the internal sound sources, an external signal source is routed to the filter section. The envelopes remain functional so you have to play notes in order to hear the external signal source. For instance in this mode you can manipulate the volume to chop up the input signal much the way a gate does. If you turn FILTER KEY FOLLOW up, the input signal is filtered by a different filter frequency depending on the key you

press. The sound program can still be played polyphonically and you can allocate several different filter frequencies and independent envelopes simultaneously (!) to the input signal via the MIDI keyboard.

STATIC Instead of the internal sound sources, an external signal source is routed to the filter section. In contrast to DYNAMIC mode, in STATIC mode one or two voices (depending on the INPUT SELECT setting, see appropriate section) of the Virus are activated automatically without you actually playing notes on this PART. The filters and the amplifier are switched permanently open, the envelopes are deactivated and incoming notes are ignored. Consequently you can use the filters and the amplifier as an effects section for the input signal.

INPUT SELECT



Selects the external signal source for the INPUT MODEs DYNAMIC and STATIC. You can chose from:

IN L The left channel of the external dual audio input.

IN L+R Both channels of the external dual audio input (stereo).

IN R The right channel of the external dual audio input.

AUX 1 L The left channel of internal Aux 1.

AUX 1 L+R Both channels of internal Aux 1 (stereo).

AUX 1 R The right channel of internal Aux 1.

AUX 2 L The left channel of internal Aux 2.

AUX 2 L+R Both channels of internal Aux 2 (stereo).

AUX 2 R The right channel of internal Aux 2.

If the selected signal source is a stereo source - i.e. IN L R, AUX 1 L R or AUX 2 L R - then the sound program is automatically switched internally to TWIN-MODE regardless of the TWIN MODE parameter setting so that the input signal is processed in stereo. In this case, the TWIN parameters PAN SPREAD and LFO PHASE (see appropriate section) are active.

When you select an internal aux path as a signal source, you of course must route the signals of another PART to this aux path via OUTPUT SELECT before you can establish a signal connection between the two PARTS. Several PARTs can simultaneously access the external input or the internal aux paths via INPUT SELECT.

INPUT BOOST

With INPUT BOOST, you can increase the signal level of the two external inputs by up to 36 dB. The signal is boosted in the digital section of the Virus, so the noise level of the analog-digital converter increases automatically. Consequently you should dial in the cleanest, loudest possible signal at the external sound generator. The Virus features a signal level indicator that allows you to monitor the signal level visually: see LED MODE in the CTRL menu. You should only turn up the INPUT BOOST when you are unable to dial in a sufficient signal level prior to the external inputs. At a value of 0, the signal level is not boosted at all.
This is a global parameter, i.e. it affects all involved PARTs and INPUT DIRECT THRU (see paragraph below). It is not stored along with the SINGLE PROGRAM.

INPUT DIRECT THRU

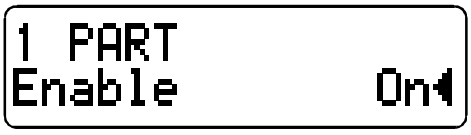
The stereo signal patched to the external inputs can be routed to the dual-jack Output 1 without being processed in any manner. For instance you can blend the output signal of another sound generator with the output signal of the Virus and send the mixed signal to Output 1 without having to use an external mixing console. INPUT DIRECT THRU controls the level of this direct signal path.
This is a global parameter, i.e. it is not stored along with the SINGLE PROGRAM.

Sound Parameters in the CTRL Menu (Single)

PART

PART ENABLE

This PART parameter is a MULTI MODE parameters and is stored along with the current MULTI PROGRAM. Consequently, it is available in MULTI MODE. It is also available in the SINGLE CTRL menu when MULTI SINGLE MODE is active. Why Because it comes in handy when you are working with sequencers.



Switches the MIDI receive mode of a given PART ON and OFF, i.e. enables reception of MIDI data.
In SINGLE MODE, PART ENABLE does not appear in the menu because a SINGLE is permanently set to MIDI enable.

COMMON

KEY MODE

Determines how a sound responds to incoming MIDI notes. You can chose from:

POLY The sound is played polyphonically; In MULTI MODE, the given PART is active in the dynamic distribution of voices.

MONO 1 The sound is played monophonically; when you play in a smooth, even style (legato) the envelopes are restarted every time you play a note (Multi Trigger mode); Portamento is always active.

MONO 2 The sound is played monophonically; when you play in a smooth, even style (legato) the envelopes are restarted every time you play a note (Multi Trigger mode); Portamento is only active when you play legato.

MONO 3 The sound is played monophonically; when you play in a smooth, even style (legato) the envelopes are restarted at the first note only and continue to run through their phases when you play other notes (Single Trigger mode); Portamento is always active.

MONO 4 The sound is played monophonically; when you play in a smooth, even style (legato) the envelopes are restarted at the first note only and continue to run through their phases when you play other notes (Single Trigger mode); Portamento is only active when you play legato.

PORTAMENTO

Determines the amount of time it takes for the pitch to glide from the current note to the next note played.
PORTAMENTO is a significant feature of KEY MODE (see paragraph above); the two are closely related.

BEND UP

Determines the interval of the bend when the Pitch Bender is moved upwards to the full extent of its range. Control range: -64 semitones to 63 semitones.

BEND DOWN

Determines the interval of the bend when the Pitch Bender is moved downwards to the full extent of its range. Control range: -64 semitones to 63 semitones.

BEND SCALE

Determines the shape of the curve which in turn determines the effect of the Pitch Bend data. You can chose from:

LIN Starting from the 0 value, (center position) the pitch bend is linear. In other words, when you bend the pitch up to exactly half the distance of the pitch bend s full range, the interval you hear is equivalent to exactly half of the value you set for BEND UP (see paragraph above).

EXP Starting from the 0 value (center position) the pitch bend is exponential - at first the bend is gradual and as you move further away from the center position, the pitch is bent ever more radically. In this mode you can achieve slight fluctuations in pitch, for instance a manual vibrato, provided you can maintain a soft touch, yet still have the option of generating greater intervals because of the exponential increase in range.

CLOCK TEMPO

The Virus is equipped with a dedicated clock generator which can trigger the LFOs, control the arpeggiator and set the delay to a - in musical terms - practical, sensible value. It enables you to create a common rhythmic structure for these elements and ensure the follow the main clock in unison.

You can also synchronize the clock generator to the MIDI CLOCK of an external sequencer. The tempo of the clock generator is set globally via CLOCK TEMPO in beats per minute. You have an available control range of 62 to 190 BPM (beats per minute). You can set the rhythmic resolution of the clock generator - in other words, the notes, individually for each involved function (ARPEGGIATOR CLOCK, LFO 1 CLOCK, LFO 2 CLOCK, DELAY CLOCK, refer to the respective sections).

You can set a tempo outside the normal 62-190 BPM range by determining a rhythmic resolution other than 1/1.

In SINGLE MODE, CLOCK TEMPO pertains to the current SINGLE PROGRAM and is stored along with it. In MULTI MODE, the CLOCK TEMPO settings for the involved SINGLE PROGRAMs are ignored. Instead, all involved SINGLE PROGRAMs are controlled via the same clock generator. Its CLOCK TEMPO is saved in the MULTI PROGRAM. This feature lets you control the LFOs and arpeggiators of several MULTI PARTS in a common rhythmic context.
If you activate the MIDI CLOCK in a connected sequencer and send it to the Virus, the Virus clock generator is AUTOMATICALLY synchronized to the incoming MIDI CLOCK; the internal CLOCK TEMPO setting is ignored. When the Virus no longer receives external MIDI CLOCK information, the internal CLOCK TEMPO setting is automatically activated.

To avoid confusion, please keep in mind that MIDI Clock is not the same thing as MIDI Time Code. The latter doesn't deal with tempo at all but with time-related information structured in hours, minutes, seconds, etc. which is of no benefit to you in this context. A lower-case c will appear in the display when the Virus is receiving MIDI Clock data.

ARPEGGIATOR

ARPEGGIATOR CLOCK

The arpeggiator plays the notes in intervals determined by the clock setting (in note values). The note value represents a fraction of a 4/4 beat. The actual tempo is determined by the global clock generator. You can set the tempo via CLOCK TEMPO (refer to this section). The clock generator can also be synchronized to external MIDI clock.

ARPEGGIATOR MODE

Selects the Arpeggiator mode. You can chose from:

OFF Self-explanatory. The Arpeggiator is inactive.

UP Sustained notes are arpeggiated in an ascending manner.

DOWN Sustained notes are arpeggiated in descending manner.

UP & DOWN Sustained notes are arpeggiated alternately in an ascending and descending manner.

AS PLAYED Sustained notes are arpeggiated in the sequence that they are played. It is possible to latch the Arpeggiator with the sustain pedal.

ARPEGGIATOR OCTAVES

Controls the ascending transposition of arpeggios by octaves. Control range: 1 to 4 octaves.

VELOCITY

VELOCITY OSC 1 SHAPE

Determines the intensity of the VELOCITY control for the first oscillator s SHAPE parameter (see appropriate section).

VELOCITY OSC 2 SHAPE

Determines the intensity of the VELOCITY control for the second oscillator s SHAPE parameter (see appropriate section).

VELOCITY PULSE WIDTH

Determines the intensity of the VELOCITY control for the pulse width (see appropriate section) of both oscillators.

VELOCITY FM AMOUNT

Determines the intensity of the VELOCITY control for the frequency modulation.

VELOCITY FILT 1 ENV AMT

Determines the intensity of the VELOCITY control for the modulation of Filter 1 s cutoff frequency by the filter envelope.

VELOCITY FILT 2 ENV AMT

Determines the intensity of the VELOCITY control for the modulation of Filter 2 s cutoff frequency by the filter envelope.

VELOCITY RESONANCE 1

Determines the intensity of the VELOCITY control for the resonance of Filter 1.

VELOCITY RESONANCE 2

Determines the intensity of the VELOCITY control for the resonance of Filter 2.

VELOCITY VOLUME

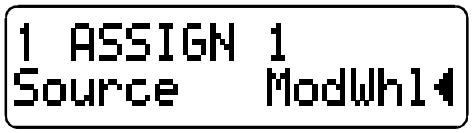
Determines the intensity of the VELOCITY control for the volume.

VELOCITY PANORAMA

Determines the intensity of the VELOCITY control for the Panorama position.

CONTROLLER ASSIGN

ASSIGN 1 SOURCE



Selects the modulation source for the first modulation assignment. For a list of available modulation sources, please consult the Appendix of this manual.

ASSIGN 1 DESTINATION

Selects the modulation destination for the first modulation assignment. For a list of available modulation destinations, please consult the Appendix of this manual.

ASSIGN 1 AMOUNT

Controls the intensity of the first modulation allocation.

ASSIGN 2 SOURCE

Selects the modulation source for the second modulation assignment. For a list of available modulation sources, please consult the appendix of this manual.

ASSIGN 2 DESTINATION 1

Selects the first modulation destination for the second modulation assignment. For a list of available modulation destinations, please consult the Appendix of this manual.

ASSIGN 2 AMOUNT 1

Controls the intensity of the second modulation assignment for the first modulation destination.

ASSIGN 2 DESTINATION 2

Selects the second modulation destination for the second modulation assignment. For a list of available modulation destinations, please consult the Appendix of this manual.

ASSIGN 2 AMOUNT 2

Controls the intensity of the second modulation assignment for the second modulation destination.

ASSIGN 3 SOURCE

Selects the modulation source for the third modulation assignment. For a list of available modulation sources, please consult the Appendix of this manual.

ASSIGN 3 DESTINATION 1

Selects the first modulation destination for the third modulation assignment. For a list of available modulation destinations, please consult the Appendix of this manual.

ASSIGN 3 AMOUNT 1
Controls the intensity of the third modulation assignment for the first modulation destination.

ASSIGN 3 DESTINATION 2
Selects the second modulation destination for the third modulation assignment. For a list of available modulation destinations, please consult the Appendix of this manual.

ASSIGN 3 AMOUNT 2
Controls the intensity of the third modulation assignment for the second modulation destination.

ASSIGN 3 DESTINATION 3
Selects the third modulation destination for the third modulation assignment. For a list of available modulation destinations, please consult the Appendix of this manual.

ASSIGN 3 AMOUNT 3
Controls the intensity of the third modulation assignment for the third modulation destination.

DEFINABLE 1 / DEFINABLE 2

Two knobs labeled DEFINABLE are located on the control panel of the Virus. These can be used for direct control of a number of parameters that are not normally assigned to dedicated knobs.

DEFINABLE 1 MODE

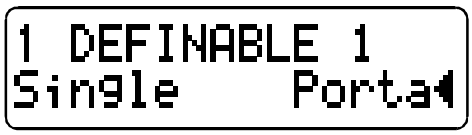
Selects the operating mode of the DEFINABLE 1 knob. You can select from:

SINGLE The destination of the DEFINABLE 1 knob is defined via the Display page entitled DEFINABLE 1 SINGLE (see paragraph below). If you set it to OFF, then the alternative setting in the Display page - DEFINABLE 1 GLOBAL - is active.

GLOBAL The destination of the DEFINABLE 1 knob is always defined via the Display page entitled DEFINABLE 1 GLOBAL (see paragraph below). When you select the position GLOBAL, individual DEFINABLE SINGLE settings are deactivated.

MIDI The knob sends a variable MIDI Controller via the current PART s channel to MIDI OUT. For instance, this feature lets you control the parameters of another connected MIDI device. You can set the number of the MIDI Controller in the Display page DEFINABLE 1 MIDI (see paragraph below).

DEFINABLE 1 SINGLE

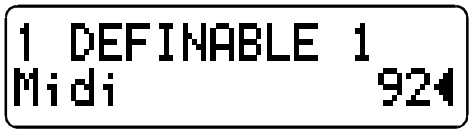


This is where you enter the parameter assignment for the DEFINABLE 1 knob. The entry is an element of the current SINGLE PROGRAM and is stored along with it. The entry is only active when DEFINABLE 1 MODE is set to SINGLE. When DEFINABLE 1 SINGLE is set to OFF, the Display page setting DEFINABLE 1 GLOBAL is activated.

DEFINABLE 1 GLOBAL

This is where you enter the parameter assignment for the DEFINABLE 1 knob. The entry remains valid regardless of the currently selected SINGLE PROGRAM. The entry is only active when DEFINABLE 1 MODE is set to GLOBAL or SINGLE; although in the latter case DEFINABLE 1 SINGLE in the current SINGLE PROGRAM must be set to OFF before the entry is activated.

DEFINABLE 1 MIDI



This is where you enter the MIDI Controller assignment for the DEFINABLE 1 knob. The Controller is routed via MIDI Out for the purpose of controlling a connected MIDI device. The entry is only active when DEFINABLE 1 MODE is set to MIDI.

DEFINABLE 2 MODE

Selects the operating mode for the DEFINABLE 2 knob. You can select from:

SINGLE The destination of the DEFINABLE 2 knob is defined via the Display page entitled DEFINABLE 2 SINGLE (see paragraph below). If you set it to OFF, then the alternative setting in the Display page - DEFINABLE 2 GLOBAL - is active.

GLOBAL The destination of the DEFINABLE 2 knob is always defined via the Display page entitled DEFINABLE 2 GLOBAL (see paragraph below).When you select the position GLOBAL, individual DEFINABLE SINGLE settings are deactivated.

MIDI The knob sends a variable MIDI Controller via the current PART s channel to MIDI OUT. For instance, this feature lets you control the parameters of another connected MIDI device. You can set the number of the MIDI Controller in the Display page DEFINABLE 2 MIDI (see paragraph below).

DEFINABLE 2 SINGLE

This is where you enter the parameter assignment for the DEFINABLE 2 knob. The entry is an element of the current SINGLE PROGRAM and is stored along with it. The entry is only active when DEFINABLE 2 MODE is set to SINGLE. When DEFINABLE 2 SINGLE is set to OFF, the Display page setting DEFINABLE 2 GLOBAL is activated.

DEFINABLE 2 GLOBAL

This is where you enter the parameter assignment for the DEFINABLE 2 knob. The entry remains valid regardless of the currently selected SINGLE PROGRAM. The entry is only active when DEFINABLE 2 MODE is set to GLOBAL or SINGLE; although in the latter case DEFINABLE 2 SINGLE in the current SINGLE PROGRAM must be set to OFF before the entry is activated.

DEFINABLE 2 MIDI
This is where you enter the MIDI Controller assignment for the DEFINABLE 2 knob. The Controller is routed via MIDI Out for the purpose of controlling a connected MIDI device. The entry is only active when DEFINABLE 2 MODE is set to MIDI.

Global Parameters / System Parameters / MIDI Parameters

The following parameters are global parameters and are accessible at any time in the CTRL menu regardless of the current operating mode.

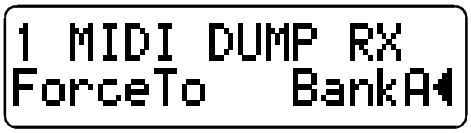
MIDI DUMP TX

This feature transfers the sound data of one Virus to another Virus, a computer or a hardware sequencer via MIDI. The dump is executed via system exclusive data. You can chose from the following dump options:

SINGLE	The sound program of the current PART is sent from the Edit buffer.
SINGLE BANK A	All 128 sound programs of Bank A are sent.
SINGLE BANK B	All 128 sound programs of Bank B are sent.
MULTI	The current multi program is sent.
MULTI BANK	All multis are sent.

Once you have selected the desired data type, the dump is initiated via STORE.

MIDI DUMP RX



If you want to send MIDI data to the Virus, you don t have to log in first. The Virus automatically accepts incoming data via its MIDI In port. However, you can determine where the data of a complete incoming bank is stored. In contrast, single sound are always first dumped in the Edit buffer; you have to manually store them somewhere else, otherwise they are deleted by the next program change.

DISABLE	Incoming data via MIDI IN is ignored.
ENABLE	Bank data is re-loaded to the bank from which they were originally dumped, regardless of which bank is currently selected.
FORCE TO BANK A	Bank data is loaded to Bank A exclusively.
FORCE TO BANK B	Bank data is loaded to Bank B exclusively

FORCE TO EDIT Loads the single programs of the bank to the Edit buffer one by one, whereby the each preceding single sound is deleted by the one following it. This function treats a bank dump as a succession of single sounds and comes in handy when you want to search an unfamiliar bank or load single sounds without having to load the entire bank.

MIDI

GLOBAL CHANNEL

Selects the MIDI channels for SINGLE MODE and the program switching option for entire MULTI PROGRAMs in MULTI MODE. In MULTI SINGLE MODE, the MULTI MODE switching option is locked (permanently deactivated). The number in the upper left of the display shows the MIDI Global Channel in Single Mode and the current Partnumber if the VIRUS is in Multi Mode or Multi Single Mode.

MIDI PANEL DESTINATION

INTERNAL All types of control operations are sent directly to the Virus sound generation components and not to the MIDI Out.

INT+MIDI All types of control operations are sent directly to the Virus sound generation components and simultaneously to MIDI Out.

MIDI All types of control operations are sent exclusively to MIDI-Out, the internal signal path is severed. This option is equivalent to the classic Local Off function.

MIDI SOFT THRU

ON All data patched in via MIDI IN are routed to MIDI OUT, much like a MIDI THRU.

OFF MIDI SOFT THRU is deactivated.

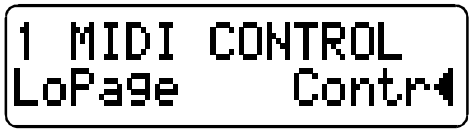
MIDI VOLUME ENABLE

Globally switches the reception of Volume data (Ctrl 7) on and off.

PRG CHANGE ENABLE

Globally swithes the reception of Program Change Data on and off.

MIDI CONTROL LOW PAGE

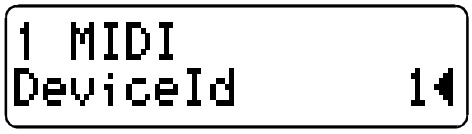


Here you can determine if you want the first 128 parameters to be sent as system exclusive data (SYS EX) or as MIDI Controllers (CONTR) when you have activated MIDI LOCAL OFF (see appropriate section).

MIDI CONTROL HIGH PAGE

Here you can determine if you want the second 128 parameters to be sent as system exclusive data (SYS EX) or as MIDI PolyPressure data (POLY PRS) when you have activated MIDI LOCAL OFF (see appropriate section).

MIDI DEVICE ID

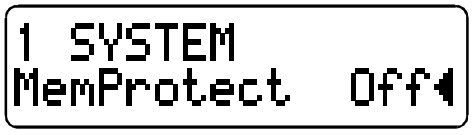


Here you can enter the identification number for system exclusive data transfer. To enable communication between two Virus units - i.e. to exchange system exclusive data - you must assign the same MIDI DEVICE ID to both units.

SYSTEM MASTER TUNE

Determines the overall pitch of the Virus. 0 A 440 Hz.

SYSTEM MEMORY PROTECT

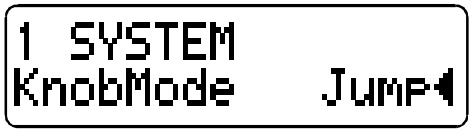


Locks (ON) or unlocks (OFF) the memory in which the sounds of the Virus are stored.
When you switch MEMORY PROTECT on, you can avoid inadvertent overwriting of programs when you accidentally press the STORE button.

SYSTEM LCD CONTRAST

Lets you adjust the contrast of the LC display to different light conditions and viewing angles.

SYSTEM KNOB MODE



Provides a selection of several knob operating modes which you can activate depending on personal preference or suitability to the tasks you currently dealing with:

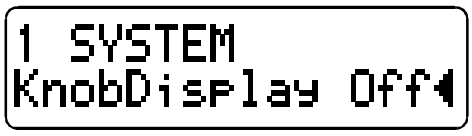
OFF The knobs are inactive.

JUMP In ump Mode, the parameter jumps directly and absolutely to the value determined by the current position of the knob.

SNAP When you adjust a knob In Snap Mode, the original setting determines the value until the point where the movement of the knob passes beyond this position. The parameter does not jump to the value as in UMP Mode.

RELATIVE When you adjust a knob in RELATIVE Mode, the parameter is affected immediately but not absolutely. The value change from the original value to the new value reflects precisely the amount you adjusted via a given control.

KNOB DISPLAY



In an active menu, SYSTEM KNOB DISPLAY offers different display option for parameters that have knobs assigned to them:

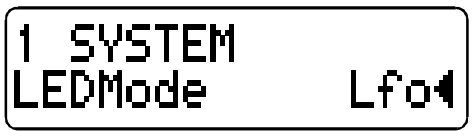
OFF Knob movements are not displayed; the current contents of the display remain intact when you turn a knob.

SHORT When you turn a knob, the current contents of the lower display line are briefly overwritten by data representing the change in parameter value; once the action is completed, the original contents reappear in the lower display line.

LONG Same as SHORT, except that - you guessed it - the display shows the knob data for a longer period of time.

ON The contents of the display are overwritten when you turn a knob; the original menu does not reappear in the display.

SYSTEM LED MODE



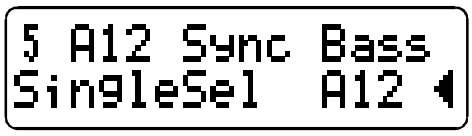
Here you can chose between two operating modes for the RATE LEDs of LFO 1 and 2:

LFO The LEDs indicate the oscillations of the LFOs.

INPUT The LEDs serve as level indicators for the two external audio inputs (RATE 1 Input L; RATE 2 Input R). The brightness of the LEDs indicates the current input level; signal saturation is indicated by rapidly flashing LEDs.
To achieve maximum sound quality for the system, you should set the input signal to a level that is as close as possible to the saturation threshold. However you should avoid setting the level beyond the saturation threshold, otherwise you will hear undesirable distortion in the signal.
You can also use the level indicators to see if an input signal is actually patched in.

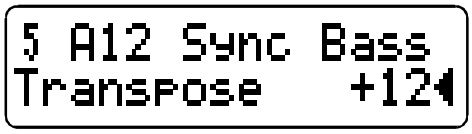
MULTI Parameters in the EDIT menu

SINGLE SELECT



Activates a SINGLE PROGRAM for the current PART.

PART TRANSPOSE

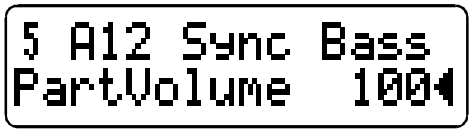


Transposes the PART in semitone steps.

PART DETUNE

Fine-tunes the PART.

PART VOLUME

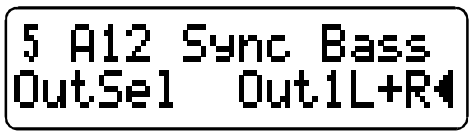


Controls the volume level of the PART. In addition to PATCH VOLUME (in the EDIT menu, see appropriate section) and MIDI Volume (Controller 7), PART VOLUME is the third option for determining the volume level of a PART within a MULTI program. Please keep in mind that PART VOLUME is a bipolar parameter: In the negative half of the control range (-64 to 0) the signal level is controlled in the normal fashion - i.e. the sound fades out as negative numbers increase; from the center value upwards (0 to 63), extremely low-level signals are amplified. When you set values greater than 0 for sounds that are already fairly loud, you may hear undesirable digital distortion.
In SINGLE MODE, PART VOLUME does not appear in the menu; in this case the value is automatically set to 0.

PANORAMA OFF/ -63 to 127

Lets you dial in a basic setting for MIDI Controller 10 (MIDI Panorama). If you enter a value between 1 and 127, this value is valid after you call up a MULTI PROGRAM until the first Controller 10 event is received on the given channel. If you set PANORAMA to OFF, the basic setting for Controller 10 is determined by the last received Controller 10 value prior to a program change so that the PANORAMA value remains intact after a program change.

OUTPUT SELECT



This control feature is used to select external or internal output of PART. You can chose from:

OUT 1 L The left jack of dual Output 1 (mono)

OUT 1 L+R Both jacks of dual Output 1 (stereo)

OUT 1 R The right jack of dual Output 1 (mono)

OUT 2 L The left jack of dual Output 2 (mono)

OUT 2 L+R Both jacks of dual Output 2 (stereo)

OUT 2 R The right jack of dual Output 2 (mono)

OUT 3 L The left jack of dual Output 3 (mono)

OUT 3 L+R Both jacks of dual Output 3 (stereo)

OUT 3 R The right jack of dual Output 3 (mono)

AUX 1 L The left channel of internal Aux 1 (mono)

AUX 1 L+R Both channels of internal Aux 1 (stereo)

AUX 1 R The right channel of internal Aux 1 (mono)

AUX 2 L The left channel of internal Aux 2 (mono)

AUX 2 L+R Both channels of internal Aux 2 (stereo)

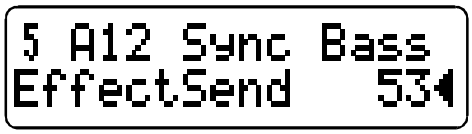
AUX 2 R The right channel of internal Aux 2 (mono)

If the selected output is monophonic, then the Panorama settings and modulations in the sound program are inactive.
When you select an internal aux path as a signal output, you of course must route the signal of another PART to this aux path via INPUT SELECT before you can establish a signal connection between the two PARTS. Several PARTs can simultaneously access the external input or the internal aux paths via OUTPUT SELECT.
In SINGLE MODE, OUTPUT SELECT does not appear in the menu; in this case Output 1 (stereo) is preset.

DELAY MULTI

In MULTI MODE, all 16 PARTs access the same Delay effect. In this case, the only dedicated parameter you have available for each part is EFFECT SEND; all other Delay parameters apply to the same Delay unit and affect all PARTs.
Consequently, if you set the Virus to MULTI MODE or MULTI SINGLE MODE, all settings you dial in for the Delay (including EFFECT SEND) affect the MULTI PROGRAM and are stored along with it. If the Virus is In MULTI MODE or MULTI SINGLE MODE and you activate a new SINGLE, the Delay parameters of the SINGLE are ignored and the Delay parameters of the current MULTI PROGRAM are valid.

EFFECT SEND



Controls the level at which the signal is routed through the Delay.
EFFECT SEND is equivalent to the post-fade effects loop of a mixing console.

TIME

Controls the delay time.

CLOCK

When you set it to OFF, the absolute delay time is determined in milliseconds. If you select a note value, then the delay time is set to the value of this note. The absolute length of this note value depends on the value entered to CLOCK TEMPO in the global clock generator (refer to this section). In this case, the entered absolute delay time in milliseconds is ignored.

In contrast to the LFOs and the arpeggiator, here you cannot synchronize the delay time to an external MIDI-Clock. Why Because the delay is not generated by the clock generator, it actually operates independently. Even though the clock generator is actually synchronized via MIDI Clock, you can still manually synchronize the delay to an external sequencer by setting the tempo of the clock generator (CLOCK TEMPO) to the same (or as close as possible) tempo of the current arrangement and come up with fairly musical results.

FEEDBACK

Controls the amount of feedback of the Delay.

RATE

Determines the speed of the Delay LFO.

DEPTH

Controls the intensity of the delay modulation by the LFO.
Like the Chorus LFO, the Delay LFO modulates the left and right sides of the signal antiphase, which generates a true stereo effect.

SHAPE

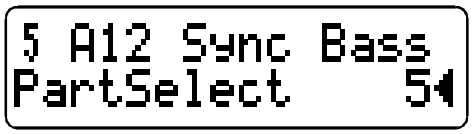
Determines the waveshape of the Delay LFO. You can select from sine, triangle, sawtooth, pulse, an incremental random modulation (S H; abb. for Sample Hold) and a continual random modulation S G (abb. for: Sample Glide) waves.

OUTPUT SELECT

Here you can select an external or internal Delay output. The same destinations are available as for the PARTs. This feature lets you route the Delay signal to the internal aux paths for further processing.

MULTI Parameters in the CTRL Menu

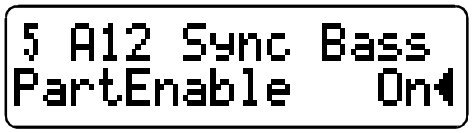
PART SELECT 1 - 16



Lets you chose one of the 16 PARTs for further processing. The current Partnumber is displayed in the upper left of the LCD.

You can also switch from PART to PART by pressing and holding the MULTI button and simultaneously selecting a new PART via the VALUE buttons or the VALUE knob. In MULTI MODE and MULTI SINGLE MODE, you can select Parts via the Parameter buttons, if there is no Menu selected (Playmode).

PART ENABLE



Switches the MIDI receive mode of a given PART ON and OFF, i.e. enables reception of MIDI data.

MIDI CHANNEL

Selects the MIDI channel of the PART.

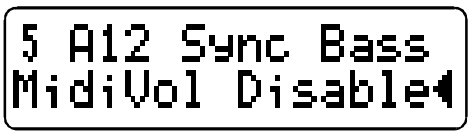
LOW KEY

Determines the lowest MIDI note that the PART responds to.

HIGH KEY

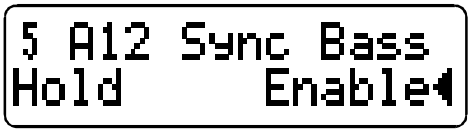
Determines the highest MIDI note that the PART responds to.

MIDI VOLUME ENABLE



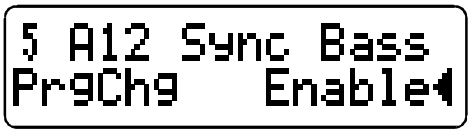
Switches a given PART s MIDI receive mode for MIDI Controller 7 (volume) ON and OFF.

HOLD PEDAL ENABLE



Switches a given PART s MIDI receive mode for MIDI Controller 64 (Sustain) ON and OFF.

PRG CHG ENABLE



Switches a given PART s MIDI receive mode for MIDI Program Change messages ON and OFF.

The following MULTI CTRL menu parameter groups are identical to those in the SINGLE CTRL menu. For detailed information, consult the appropriate paragraphs in the SINGLE CTRL menu section.

CLOCK TEMPO

DEFINABLE 1

DEFINABLE 2

MIDI

SYSTEM

DEFINABLE 1/2 Parameter

0-91	Patch Volume	0..127	
0-7	Channel Volume	0..127	
0-10	Panorama	-64..0.. 63	Left..Center..Right
0-93	Transpose	-64.. 63	
0-5	Portamento Time	0..127	
0-98	Twin Detune	0..127	
0-99	Panorama Spread	0..127	
0-100	Twin Lfo Phase	-64.. 63	
0-18	Osc1 Pulsewidth	0..127	
0-19	Osc1 Wave Select	0..64	Sine, Triangle, Wave 3..64
0-20	Osc1 Semitone	-64.. 63	
0-21	Osc1 Keyfollow	-64.. 63	Default: 32
0-23	Osc2 Pulsewidth	0..127	
0-24	Osc2 Wave Select	0..64	Sine, Triangle, Wave 3..64
0-29	Osc2 Filt Env Amt	-64.. 63	
0-30	FM Filt Env Amt	-64.. 63	
0-31	Osc2 Keyfollow	-64.. 63	Default: 32
0-37	Noise Volume	0..127	
0-42	Filter1 Resonance	0..127	
0-43	Filter2 Resonance	0..127	
0-44	Filter1 Env Amt	0..127	
0-45	Filter2 Env Amt	0..127	
0-46	Filter1 Keyfollow	-64.. 63	
0-47	Filter2 Keyfollow	-64.. 63	
0-71	Lfo1 Symmetry	-64.. 63	
0-74	Osc1 Lfo1 Amount	-64.. 63	
0-75	Osc2 Lfo1 Amount	-64.. 63	
0-76	PlsWdh Lfo1 Amount	-64.. 63	
0-77	Reso Lfo1 Amount	-64.. 63	
0-78	FiltGain Lfo1 Amount	-64.. 63	
0-83	Lfo2 Symmetry	-64.. 63	
0-86	OscShape Lfo2 Amount	-64.. 63	
0-87	FmAmount Lfo2 Amount	-64.. 63	
0-88	Cutoff1 Lfo2 Amount	-64.. 63	
0-89	Cutoff2 Lfo2 Amount	-64.. 63	
0-90	Panorama Lfo2 Amount	-64.. 63	
0-91	Patch Volume	0..127	
0-105	Chorus Mix	-64.. 63	
0-106	Chorus Rate	0..127	
0-107	Chorus Depth	0..127	
0-108	Chorus Delay	0..127	
0-109	Chorus Feedback	0..127	

0-113	Effekt Send	0..127	
0-114	Delay Time	0..127	
0-115	Delay Feedback	0..127	
0-116	Delay Rate	0..127	
0-117	Delay Depth	0..127	
1-7	Lfo3 Rate	0..127	
1-12	Osc Lfo3 Amount	0..127	
1-16	Clock Tempo	0..127	62..190 BPM
1-35	Osc Init Phase	0..127	0:Off 1..127
1-36	Punch Intensity	0..127	
1-47	Osc1 Shape Velocity	-64.. 63	
1-48	Osc2 Shape Velocity	-64.. 63	
1-49	PulseWidth Velocity	-64.. 63	
1-50	Fm Amount Velocity	-64.. 63	
1-52	Filter1 EnvAmt Velocity	-64.. 63	
1-53	Filter1 EnvAmt Velocity	-64.. 63	
1-56	Resonance1 Velocity	-64.. 63	
1-57	Resonance2 Velocity	-64.. 63	
1-60	Amp Velocity	-64.. 63	
1-61	Panorama Velocity	-64.. 63	
1-66	Assign1 Amount	-64.. 63	
1-69	Assign2 Amount1	-64.. 63	
1-71	Assign2 Amount2	-64.. 63	
1-74	Assign3 Amount1	-64.. 63	
1-76	Assign3 Amount2	-64.. 63	
1-78	Assign3 Amount3	-64.. 63	
1	Modulation		
2	Breath		
3	Controller 3		
4	Foot Controller		
6	Data Slider		
8	Balance		
9	Controller 9		
11	Expression		
12	Controller 12		
13	Controller 13		
14	Controller 14		
15	Controller 15		
16	Controller 16		
64	Hold Pedal		
65	Portamento Pedal		
66	Sostenuto Pedal		
	Input Direct Thru		

ASSIGN 1-3 Source- and Destination-Parameter

Sources

	Off
	Pitch Bend
	Channel Pressure
1	Modulation
2	Breath
3	Controller 3
4	Foot Controller
6	Data Slider
8	Balance
9	Controller 9
11	Expression
12	Controller 12
13	Controller 13
14	Controller 14
15	Controller 15
16	Controller 16
64	Hold Pedal
65	Portamento Pedal
66	Sostenuto Pedal

Destinations

	Off		
0-91	Patch Volume	0..127	
0-7	Channel Volume	0..127	
0-10	Panorama	-64..0.. 63	Left..Center..Right
0-93	Transpose	-64.. 63	
0-5	Portamento Time	0..127	
0-17	Osc1 Shape	-64..0.. 63	Wave..Saw..Pulse
0-18	Osc1 Pulsewidth	0..127	
0-19	Osc1 Wave Select	0..64	Sine, Triangle, Wave 3..64
0-20	Osc1 Semitone	-64.. 63	
0-21	Osc1 Keyfollow	-64.. 63	Default: 32
0-22	Osc2 Shape	-64..0.. 63	Wave..Saw..Pulse
0-23	Osc2 Pulsewidth	0..127	
0-24	Osc2 Wave Select	0..64	Sine, Triangle, Wave 3..64
0-25	Osc2 Semitone	-64.. 63	
0-26	Osc2 Detune	0..127	
0-27	Osc2 FM Amount	0..127	
0-29	Osc2 Filt Env Amt	-64.. 63	
0-30	FM Filt Env Amt	-64.. 63	
0-31	Osc2 Keyfollow	-64.. 63	Default: 32
0-33	Osc Balance	-64.. 63	Osc1..Osc1 2..Osc2
0-34	Suboscillator Volume	0..127	
0-36	Osc Mainvolume	0..127	

0-37	Noise Volume	0..127	
0-40	Cutoff	0..127	
0-41	Cutoff2	-64.. 63	
0-42	Filter1 Resonance	0..127	
0-43	Filter2 Resonance	0..127	
0-44	Filter1 Env Amt	0..127	
0-45	Filter2 Env Amt	0..127	
0-46	Filter1 Keyfollow	-64.. 63	
0-47	Filter2 Keyfollow	-64.. 63	
0-48	Filter Balance	-64.. 63	
0-54	Filter Env Attack	0..127	
0-55	Filter Env Decay	0..127	
0-56	Filter Env Sustain	0..127	
0-57	Filter Env Sustain Time	- 64.. 63	Fall..Infinite..Rise
0-58	Filter Env Release	0..127	
0-59	Amp Env Attack	0..127	
0-60	Amp Env Decay	0..127	
0-61	Amp Env Sustain	0..127	
0-62	Amp Env Sustain Time	-64.. 63	Fall..Infinite..Rise
0-63	Amp Env Release	0..127	
0-67	Lfo1 Rate	0..127	
0-71	Lfo1 Symmetry	-64.. 63	
0-74	Osc1 Lfo1 Amount	-64.. 63	
0-75	Osc2 Lfo1 Amount	-64.. 63	
0-76	PlsWdh Lfo1 Amount	-64.. 63	
0-77	Reso Lfo1 Amount	-64.. 63	
0-78	FiltGain Lfo1 Amount	-64.. 63	
0-79	Lfo2 Rate	0..127	
0-83	Lfo2 Symmetry	-64.. 63	
0-86	OscShape Lfo2 Amount	-64.. 63	
0-87	FmAmount Lfo2 Amount	-64.. 63	
0-88	Cutoff1 Lfo2 Amount	-64.. 63	
0-89	Cutoff2 Lfo2 Amount	-64.. 63	
0-90	Panorama Lfo2 Amount	-64.. 63	
1-7	Lfo3 Rate	0..127	
1-12	Osc Lfo3 Amount	0..127	
0-98	Twin Detune	0..127	
0-99	Panorama Spread	0..127	
0-100	Twin Lfo Phase	-64.. 63	
0-105	Chorus Mix	-64.. 63	
0-106	Chorus Rate	0..127	
0-107	Chorus Depth	0..127	
0-108	Chorus Delay	0..127	
0-109	Chorus Feedback	0..127	

0-113	Effekt Send	0..127	
0-114	Delay Time	0..127	
0-115	Delay Feedback	0..127	
0-116	Delay Rate	0..127	
0-117	Delay Depth	0..127	
1-47	Osc1 Shape Velocity	-64.. 63	
1-48	Osc2 Shape Velocity	-64.. 63	
1-49	PulseWidth Velocity	-64.. 63	
1-50	Fm Amount Velocity	-64.. 63	
1-52	Filter1 EnvAmt Velocity	-64.. 63	
1-53	Filter1 EnvAmt Velocity	-64.. 63	
1-56	Resonance1 Velocity	-64.. 63	
1-57	Resonance2 Velocity	-64.. 63	
1-60	Amp Velocity	-64.. 63	
1-61	Panorama Velocity	-64.. 63	
1-35	Osc Init Phase	0..127	0:Off 1..127
1-36	Punch Intensity	0..127	

MIDI CONTROLLER Assignments

Ctrl.No.	Range	Parameter	Value Range	Remarks
0	0...1	Bank Select	0...1	0: Bank A, 1: Bank B
1	0...127	Modulation Wheel	0...127	
5	0...127	Portamento Time	0...127	
7	0...127	Channel Volume	0...127	
10	0...127	Panorama	-64...0... 63	Left..Center..Right
17	0...127	Osc1 Shape	-64...0... 63	Wave..Saw..Pulse
18	0...127	Osc1 Pulsewidth	0...127	
19	0...64	Osc1 Wave Select	0...64	Sine, Triangle, Wave 3..64
20	0...127	Osc1 Semitone	-64... 63	
21	0...127	Osc1 Keyfollow	-64... 63	Default: 32
22	0...127	Osc2 Shape	-64...0... 63	Wave..Saw..Pulse
23	0...127	Osc2 Pulsewidth	0...127	
24	0...64	Osc2 Wave Select	0...64	Sine, Triangle, Wave 3..64
25	0...127	Osc2 Semitone	-64... 63	
26	0...127	Osc2 Detune	0...127	
27	0...127	Osc2 FM Amount	0...127	
28	0...1	Osc2 Sync	0...1	0:Off 1:On
29	0...127	Osc2 Filt Env Amt	-64... 63	
30	0...127	FM Filt Env Amt	-64... 63	
31	0...127	Osc2 Keyfollow	-64... 63	Default: 32
32	0...1	Bank Select	0...1	0: Bank A; 1: Bank B
33	0...127	Osc Balance	-64... 63	Osc1..Osc1 2..Osc2
34	0...127	Suboscillator Volume	0...127	
35	0...1	Suboscillator Shape	0...1	0:Square 1:Triangle
36	0...127	Osc Mainvolume	0...127	
37	0...127	Noise Volume	0...127	
40	0...127	Cutoff	0...127	
41	0...127	Cutoff2	-64... 63	
42	0...127	Filter1 Resonance	0...127	
43	0...127	Filter2 Resonance	0...127	
44	0...127	Filter1 Env Amt	0...127	
45	0...127	Filter2 Env Amt	0...127	
46	0...127	Filter1 Keyfollow	-64... 63	
47	0...127	Filter2 Keyfollow	-64... 63	
48	0...127	Filter Balance	-64... 63	
49	0...6	Saturation Curve	0...6	0:Off 1:Light 2:Soft 3:Middle 4:Hard 5:Digital 6: Shaper
51	0...3	Filter1 Mode	0...3	0:LP 1:HP 2:BP 3:BS
52	0...3	Filter2 Mode	0...3	0:LP 1:HP 2:BP 3:BS
53	0...3	Filter Routing	0...3	0:Ser 4 1:Ser 6 2:Par 4 3:Split
54	0...127	Filter Env Attack	0...127	
55	0...127	Filter Env Decay	0...127	
56	0...127	Filter Env Sustain	0...127	
57	0...127	Filter Env Sustain Time	-64... 63	Fall...Infinite...Rise
58	0...127	Filter Env Release	0...127	

59	0...127	Amp Env Attack	0...127	
60	0...127	Amp Env Decay	0...127	
61	0...127	Amp Env Sustain	0...127	
62	0...127	Amp Env Sustain Time	-64... 63	Fall...Infinite...Rise
63	0...127	Amp Env Release	0...127	
64	0...127	Hold Pedal		
67	0...127	Lfo1 Rate	0...127	
68	0...5	Lfo1 Shape	0...5	0:Sine 1:Tri 2:Saw 3:Square 4:S H 5:S G
69	0...1	Lfo1 Env Mode	0...1	0:Off 1:On
70	0...1	Lfo1 Mode	0...1	0:Poly 1:Mono
71	0...127	Lfo1 Symmetry	-64... 63	
72	0...127	Lfo1 Keyfollow Amt	0...127	
74	0...127	Osc1 Lfo1 Amount	-64... 63	
75	0...127	Osc2 Lfo1 Amount	-64... 63	
76	0...127	PW Lfo1 Amount	-64... 63	
77	0...127	Reso Lfo1 Amount	-64... 63	
78	0...127	FiltGain Lfo1 Amount	-64... 63	
79	0...127	Lfo2 Rate	0...127	
80	0...5	Lfo2 Shape	0...5	0:Sine 1:Tri 2:Saw 3:Square 4:S H 5:S G
81	0...1	Lfo2 Env Mode	0...1	0:Off 1:On
82	0...1	Lfo2 Mode	0...1	0:Poly 1:Mono
83	0...127	Lfo2 Symmetry	-64... 63	
85	0...127	Lfo2 Keytrigger	0...127	0:Off,1..127 Keytrigger Phase
86	0...127	OscShape Lfo2 Amount	-64... 63	
87	0...127	FmAmount Lfo2 Amount	-64... 63	
88	0...127	Cutoff1 Lfo2 Amount	-64... 63	
89	0...127	Cutoff2 Lfo2 Amount	-64... 63	
90	0...127	Panorama Lfo2 Amount	-64... 63	
91	0...127	Patch Volume	0...127	
93	0...127	Transpose	-64... 63	
94	0...4	Key Mode	0...4	0:Poly 1..4: Mono1-4
97	0...1	Twin Mode	0...1	0:Off 1:On
98	0...127	Twin Detune	0...127	
99	0...127	Panorama Spread	0...127	
100	0...127	Twin Lfo Phase	-64... 63	
101	0...2	Input Mode	0...2	0:Off 1:Dynamic 2:Static
102	0...8	Input Select	0...8	0:In1L 1:In1L R 2:In1R ...
105	0...127	Chorus Mix	-64... 63	
106	0...127	Chorus Rate	0...127	
107	0...127	Chorus Depth	0...127	
108	0...127	Chorus Delay	0...127	
109	0...127	Chorus Feedback	0...127	
110	0...127	Chorus Lfo Shape	0...5	0:Sine 1:Tri 2:Saw 3:Square 4:S H 5:S G
113	0...127	Effect Send	0...127	

114	0...127	Delay Time	0...127	
115	0...127	Delay Feedback	0...127	
116	0...127	Delay Rate	0...127	
117	0...127	Delay Depth	0...127	
118	0...5	Delay Lfo Shape	0...5	0:Sine 1:Tri 2:Saw 3:Square 4:S H 5:S G
123	0	All Notes Off		

POLY PRESSURE CONTROLLER Assignments

1	0...4	Arp Mode	0...4	0:Off 1:Up 2:Down 3:Up Down 4:AsPlayed
3	0...3	Arp Octave Range	0...3	
7	0...127	Lfo3 Rate	0...127	
8	0...5	Lfo3 Shape	0...5	0:Sine 1:Tri 2:Saw 3:Square 4:S H 5:S G
9	0...1	Lfo3 Mode	0...1	0:Poly 1:Single
10	0...127	Lfo3 Keyfollow	0...127	
11	0...5	Lfo3 Destination	0...5	0:Osc1 1:Osc1 2 2:Osc2 3:PW1 4:PW1 2 5:PW2
12	0...127	Osc Lfo3 Amount	0...127	
13	0...127	Osc ModWhl Amount	0...127	
16	0...127	Clock Tempo	0...127	62...190 BPM
17	0...9	Arp Clock	0...9	1/32...1/1, 3/32...3/4
18	0...10	Lfo1 Clock	0...10	Off, 1/32...1/1, 3/32...3/4
19	0...10	Lfo2 Clock	0...10	Off, 1/32...1/1, 3/32...3/4
20	0...10	Delay Clock	0...10	Off, 1/32...1/1, 3/32...3/4
26	0...127	Bender Range Up	-64... 63	
27	0...127	Bender Range Down	-64... 63	
28	0...1	Bender Scale	0...1	0:Linear 1:Exponential
30	0...1	Filter1 Env Polarity	0...1	0:Negative 1:Positive
31	0...1	Filter2 Env Polarity	0...1	0:Negative 1:Positive
32	0...1	Filter2 Cutoff Link	0...1	0:Off 1:On
33	0...127	Filter Keytrack Base	0...127	C-1..G9
35	0...127	Osc Init Phase	0...127	0:Off 1..127
36	0...127	Punch Intensity	0...127	
47	0...127	Osc1 Shape Velocity	-64... 63	
48	0...127	Osc2 Shape Velocity	-64... 63	
49	0...127	PulseWidth Velocity	-64... 63	
50	0...127	Fm Amount Velocity	-64... 63	
52	0...127	Filter1 EnvAmt Velocity	-64... 63	
53	0...127	Filter1 EnvAmt Velocity	-64... 63	
56	0...127	Resonance1 Velocity	-64... 63	
57	0...127	Resonance2 Velocity	-64... 63	
60	0...127	Amp Velocity	-64... 63	
61	0...127	Panorama Velocity	-64... 63	

62	0...83	Definable1	see Definable List
63	0...83	Definable2	see Definable List
64	0...18	Assign1 Source	see Assign Sources List
65	0...83	Assign1 Destination	see Assign Destinations List
66	0...127	Assign1 Amount	-64... 63
67	0...18	Assign2 Source	see Assign Sources List
68	0...83	Assign2 Destination1	see Assign Destinations List
69	0...127	Assign2 Amount1	-64... 63
70	0...83	Assign2 Destination2	see Assign Destinations List
71	0...127	Assign2 Amount2	-64... 63
72	0...18	Assign3 Source	see Assign Sources List
73	0...83	Assign3 Destination1	see Assign Destinations List
74	0...127	Assign3 Amount1	-64... 63
75	0...83	Assign3 Destination2	see Assign Destinations List
76	0...127	Assign3 Amount2	-64... 63
77	0...83	Assign3 Destination3	see Assign Destinations List
78	0...127	Assign3 Amount3	-64... 63